BS Construction Management
AAS Building Construction Technology
AAS Civil Engineering Technology - Highway Emphasis
605 S. Warren Ave
GRN 227
Big Rapids, MI 49307 231.555.1234

My signature below indicates that I have reviewed the Academic Program Review report submitted for review by the Academic Program Review Council, Academic Senate, Provost, and President of Ferris State University and attest to its completeness and soundness:

R. Goosen 8.14.2018

Signature and Date

Richard Goosen
Dean
231.591.2635
RichardGoosen@ferris.edu

Robert Eastley 8-15-2018

Signature and Date

Robert Eastley
School Director
231.591.2369
RobertEastley@ferris.edu

Suzanne K. Miller 8-14-2018

Signature and Date

Suzanne K. Miller
Program Coordinator
231.591.3024
SuzanneMiller@ferris.edu

14AUG2018

Signature and Date

Lee Templin
Program Faculty
231.591.5275
LeeTempli@ferris.edu

Program Information

Construction Technology & Management Programs
American Council for Construction Education (ACCE)
2018

Evidence of Accreditation in Good Standing

See page 75 (Section 10) in Volume I which indicated (3) weaknesses and (6) concerns and how they were addressed by the program

Enrollment Trends

Academic Year	S&E Allocation	Expenditures	Enrollment	Number of Faculty (full-time equivalent)
2010 – 2011	$75,130.00	$95,114.00	289	11
2011 – 2012	$67,332.00	$93,228.00	253	11
2012 – 2013	$57,128.00	$83,426.00	220	11
2013 – 2014	$49,406.00	$64,983.00	223	10
2014 – 2015	$49,406.00	$77,056.00	220	8
2015 – 2016	$49,406.00	$74,907.00	250	7.75
2016 – 2017	$49,000.00	$74,293.00	258	7.25
2017 - 2018	$41,500.00	$75,226.50-	274	8.75

Enrollment has been increasing. Budget has been decreasing. In the fall, we will have 9 full-time faculty members, 1 faculty member on 0.5 release (Program Coordinator), and 1 faculty member on 0.75 release (School Director). Overloads in Spring 2019 are estimated to be approximately 3 credits for 8 of the faculty members. Two faculty overloads are due to teaching a course in another program.

Fall 2013 %Ret	Fall 2013 FTIACS	Spring 2014 %Ret	Fall 2014 %Ret	Fall 2014 FTIACS	Spring 2015 %Ret	Fall 2015 %Ret	Fall 2015 FTIACS	Spring 2016 %Ret	Fall 2016 %Ret	Fall 2016 FTIACS	Spring 2017 %Ret	Fall 2017 %Ret
100%	33	79%	73%	25	84%	68%	39	82%	67%	41	93%	85%

Retention appears to have taken a dip when we were building our enrollment back up and allowing students that were "on the cusp" with test scores into the program. In the last 2 years, we have implemented a more rigorous entry point to the program and work with our college's Director of Student Services to carefully screen applicants that may not be as strong in math as they need to be in order to succeed in our program.

Enrollment vs. Graduation Numbers (Institutional Research & Testing does not track graduation rates by program

Academic Year	Enrollment	Graduates
2010/11	284	69
2011/12	253	63
2012/13	220	71
2013/14	223	43
2014/15	212	38
2015/16	250	47
2016/17	258	51
2017/18	274	

The number of graduates dropped as enrollment dropped, but as enrollment increases so does our number of graduates.

Strategic Plan

See Appendix C in Volume II. It includes our Strategic Plan, Assessment Plan, and Assessment Implementation Plan.

Program-Level Student Learning Outcomes

See Appendix D in Volume II for the 20 Student Learning Outcomes established by our accrediting body. The Volume II Appendix H Updated Assessment section maps the program's performance at achieving those 20 outcomes.

Perceptions of Overall Quality

See attached letter from the Dean

Write-up included in the Program's accreditation report regarding the Program's contribution to the University:

> The Program has a hands-on, practical curriculum that prepares students for a wide variety of career options in the construction field. It emphasizes hands-on with its many lab-based classes. The courses have a career focus because the faculty all have real world experience which they bring into the classroom to engage students. The Program's focus on ethics throughout multiple classes and community service opportunities through its student group prepare students for responsible citizenship. The Bachelor degree requirements of Ferris State University and the ACCE requirements provide a broad-based educational experience for students. Ferris requires nine (9) credits in cultural courses (such as art, music, literature, history, film) and nine (9) credits in self and society (such as geography, anthropology, psychology, economics) for all

Bachelor degrees.

The program has strong connections to industry, resulting in internships and career employment following graduation. Industry has also supported the Program within the University regarding faculty needs

School Director, Program Coordinator, and Faculty perceptions of overall quality of the program:

Overall rating from faculty of 81. The summary below includes comments from the School Director (who is also a faculty member), Program Coordinator (who is also a faculty member), and faculty.

WHAT IS GOING RIGHT

- Curriculum change implementation will make significant improvements – what industry needs
- Option for students to pursue buildings or roads at the Associate's degree level
- Program encompasses new technology applicable to construction
- Employers like our graduates – repeated year recruiting effort
- Hands-on classes, especially first two years
- Program is well defined and relevant – provides breadth and variety
- Faculty have strong work experience to apply to courses – share with students
- Strong intern network
- Many faculty dedicated and knowledgeable, diverse in experience
- Industry Advisory Board members are very involved with the program. For example, increasing student interest in the industry, donating to the program's endowment, sponsoring guest speaking events, serving as an industry representative to our accrediting body.

WHERE IS IMPROVEMENT REQUIRED

- Inconsistencies of teaching rigor
- Inconsistencies in faculty advising quality
- Declining resources and increasing enrollment
    - Program must purchase faculty and classroom computers
    - Reduced travel hinders professional development
    - Hinders new practices implementation and lab support personnel
- Approximately 40% of faculty are new and need teaching experience
- Math skills of incoming students appear to be declining – requires remedial courses or faculty coaching
- Some concern regarding Senior student attitudes toward final semester/year effort
- Some faculty resistant to adding course content/upgrades
- Some faculty complain regularly but are unwilling to find solutions
- Some faculty unwilling to participate beyond teaching role – resist competitions, support
- Inconsistent teaching process rigor across classes – homework during labs, dismissing early

IDEAS FOR IMPROVEMENTS

- Increase funding that recognizes program success, need*, and growing enrollment
  *hands-on laboratories, interactive/cross functions (e.g. competitions), and field experiences

- Link/integrate more courses to represent actual conditions and challenges of the jobsite
- Integrate CTMG program specialties and attributes with other CTE programs
- Better coordinate CTMG programs with non-CTE programs which benefit CTMG
    - Accounting, Business, Communication, Math
- Encourage faculty to utilize and regularly upgrade examples to reinforce teaching theory. Continue pursuit of recent project information (drawings, 3D models, estimates, schedules, etc) from Industry Advisory Board (which has been very helpful to date)
- Encourage even greater industry involvement – special site visits, specific class -oriented lectures
- Bring industry into senior classrooms to reinforce the importance of students continuing to apply themselves in the classroom, despite it being their senior year
- Conduct some advising sessions with faculty and the college's Director of Student Services to improve consistency of advising recommendations

Evaluation of Overall Quality August 13, 2018

Building Construction Technology (AAS), Civil Engineering Technology – Highway Emphasis (AAS) and Construction Management (BS) Programs

Evaluation. My evaluation of the Construction degree programs on a 1- 100 scale with 100 representing the highest quality achievable would be 85.

Basis of Evaluation. The Construction programs evaluated as part of this Academic Program Review (APR) are an important part of the College of Engineering Technology. These programs are well respected within their industry and the faculty have actively sought to maintain the relevancy of these degrees by seeking input from their advisory board. The Construction Hall of Fame has continued to develop and has become a highly regarded event among the program's partners in the Michigan construction industry.

The enrollment of the construction degree programs has successfully survived a serious downturn in the construction industry which was exhibited in the data reflected in the most recent previous APR report of 2012. Since 2012/13 the productivity of the CONM BS degree has dramatically increased from 388.45 SCH/FTE to the most recent data from 2016/17 of 529.49 SCH/FTE. These productivity levels exceeded the averages of both the CET (431.76) and well as FSU (451.73) in 2016/17. In a similar manner the total SCH production of the construction programs covered in this report increased from 2974 in 2012/13 to 3879 in 2016/17. Graduates of these construction programs are consistently highly employable with an average starting compensation of $59,417 for program graduates in 2017 based on FSU Institutional Research and Testing data.

Funding remains a serious area of concern for these programs. Although the current budgeting effort (FY 19) will attempt to increase funding and to better balance program needs and resources, there is likely to be a continuing shortfall in Supplies and Expense (S&E) budgets for the immediate future. Since the construction programs have previously depleted their development funds to fund operating expenses, continued financial pressures are likely to force undesired changes in program operations. Many of the faculty of the Construction programs are remarkable in their level of dedication to their program. These core faculty have made exceptional efforts to obtaining funding for student scholarships and program operations. Less productive faculty have been effectively encouraged by other faculty to improve their level of performance. This willingness to assume a high level of responsibility among the program faculty is exceptional.

The program faculty have made progress in assessment practices and the recording of assessment data in the TRACDAT/Improve database used by the university. Currently the program is utilizing the 20 outcomes required by their ACCE accreditation. Using this number of outcomes will be difficult to sustain in the future and currently there are no results recorded. The program curriculum map shows outcomes not associated with program courses and courses required by the program that are not associated with any program outcome. Most of the efforts made in the TRACDAT/Improve database are relatively recent and based on the quality of analysis exhibited in the ACCE Accreditation Report provided for this APR, it should not require a major effort to place the information needed into the database.

Summary. The Building Construction Technology (AAS), Civil Engineering Technology – Highway Emphasis (AAS), and Construction Management (BS) programs have exhibited a consistent record of performance that has rebounded from a severe economic downturn which for several years paralyzed their industrial partners and severely limited enrollment. The programs today are among the best representatives of the College of Engineering Technology and it is anticipated that they will continue to grow and develop in the future.

R. Goosen

Richard F. Goosen PE, PhD
Dean
College of Engineering Technology
Ferris State University

Ferris State University – College of Engineering Technology – School of Built Environment – Construction Technology and Management Program

Self-Study for the Re-Accreditation of the Bachelor of Science in Construction Management Degree

Prepared for the American Council for Construction Education

June 2018
Volume II

Ferris State University

ACCE Accreditation Self Study Volume II

Table of Contents

APPENDIX A

Brian C. Bejcek, P.E.

Tustin, MI | (231) 878-3601 | bcbejcek@gmail.com

Summary

Highly organized educator, project manager, and engineer with a proven ability to manage large projects effectively and communicate highly technical information to a variety of audiences.

Experience

Assistant Professor 2018 – Present

Ferris State University – Big Rapids, MI

- Tenure-track professor in the Construction Management Department
- Developing two new practices based lab courses in mechanical and electrical systems
- Courses taught – Plans and Specifications, Mechanical and Electrical Systems, and Construction Economics

Director of Power Supply Planning and Development 2016 – 2017

Wolverine Power Cooperative – Cadillac, MI

- Lead development team for a potential combined cycle power plant
- Modeled Wolverine's power supply portfolio options under a variety of future economic scenarios including plant retirements
- Analyzed market intelligence and developed recommendations for long term power supply decisions

Project Manager – Alpine Power Plant 2014 – 2016

Wolverine Power Cooperative – Cadillac, MI

- Led the development, engineering, construction, and commissioning of the 430 MW natural gas power plant in Elmira, MI
- Drove the project to completion on a record pace timeline and finished under the 195 million dollar budget
- Orchestrated engineering and construction activities on a job site with over 350 craft employees
- Navigated the MISO Generator Interconnection process including testing
- Oversaw the associated transmission and distribution system projects
- Communicated progress regularly with the Board of Directors and CEO
- Negotiated multi-million dollar contracts for equipment, engineering services, and construction services
- Coordinated design reviews with the external and internal project teams

Generation Engineer 2009 – 2014
Wolverine Power Cooperative – Cadillac, MI
- Provided engineering assistance to solve mechanical and electrical problems for power generation facilities
- Trained plant personnel on technical and safety related topics
- Managed project budgets and schedules for capital improvement and maintenance of power generation facilities
- Partnered and interfaced with consultants and contractors for projects
- Supervised and directed plant personnel during projects and major maintenance outages
- Organized the generation department compliance efforts for all Federal, RTO, and State regulatory requirements

Education

Master of Science Electrical Engineering 2014
Michigan Technological University – Houghton, MI
- Graduated with a GPA of 3.72
- Power Systems concentration
- Completed online program while working full time

Bachelor of Science Mechanical Engineering 2008
Michigan Technological University – Houghton, MI
- Graduated Cum Laude with a GPA of 3.59
- Minor in Music Technology
- Member of Tau Beta Pi engineering honor society

Licensure Licensed Professional Engineer in the State of Michigan

Community

Volunteer hockey coach for Cadillac Area Hockey Association
Member of the Cadillac Symphony Orchestra
Cadillac Leadership volunteer class of 2013
- Class Project was to rehab the Daybreak adult day care center

Active member of Cadillac First Presbyterian Church

Curriculum Vitae

Ferrell Knight Clark Jr.
Ferris State University
School of Built Environment
Construction Management Department
214 Granger Center
Big Rapids, MI 49307
6718 Juneview Dr.
Rockford, MI 49341
616-490-2728
ferrellclark@ferris.edu

EDUCATION

Ferris State University
Big Rapids, MI
- Masters of Business Administration (MBA)

Ferris State University
Grand Rapids, MI
- Bachelors of Science (BA), Construction Management

Ferris State University
Big Rapids, MI
- Associates of Science (ASS), Building Construction Technology

PROFESSIONAL QUALIFICATIONS

- NCCER Certified Trainer Carpentry and Masonry
- Journeyman Carpenter NCCER
- Journeymen Bricklayer Local #1 BAC
- Michigan Residential Builders License

FSU MILESTONES

- Assistant Professor 2011
- Associate Professor 2018

FSU COURSES TAUGHT

- BCTM 213 Framing and Finishes
- CONM 111 Construction Practices
- CONM 424 Construction Safety Management
- CONM 112 Plans and Specifications
- CONM 211 Estimating – Quantity Takeoff

FSU ADVISOR ROLE

- Associated Builders and Contractors (ABC) Construction Management Student Competition 2014 – 2018
- Associated Construction Students (ACS) Student Chapter 2011 - 2018

FSU SERVICE COMMITTEES

- Sabbatical Committee 2018

EMPLOYMENT HISTORY

Associate Professor
Ferris State University
Construction Management Department
2008 – Present

Contract Superintendent
TKC Consulting
2008-Present

Superintendent
McCarthy Construction
St Louis, MO
2005 – 2008

Superintendent
Bauer Construction
Grand Rapids, MI
2000 - 2005

Owner
Bricklayer/Carpenter
Knight Construction, LLC
Grand Haven, MI
1990 – 2000

Carpenter Foreman
Schroeder Brother's Construction
Grand Haven, MI
1987 - 1990

MARK R. DYKE
CM-BIM, LEED AP, LLPC

2295 VanBuren Hudsonville, MI 49426
616-450-7449 mark@constructiontechconsultants.com

Education

Grand Rapids Theological Seminary at Cornerstone University | Grand Rapids, MI
2015 - Master of Arts: Counseling

Ferris State University | Big Rapids, MI
1997 - Bachelor of Science: Construction Technology and Management

Grand Rapids Community College | Grand Rapids, MI
1995 - Associate in Applied Arts and Sciences: Architecture

Professional Certifications/Licenses

- Associated General Contractors of America - Certificate of Management: Building Information Modeling (CM-BIM)
- Associated General Contractors of America - BIM Education Program
- LEED Accredited Professional (LEED-AP)
- AutoDesk Training Center – Navisworks Manage Essentials
- AutoDesk Training Center – Revit Architecture Essentials
- AutoDesk Training Center – Revit Structure Essentials
- AutoDesk Training Center – Revit MEP Essentials
- OSHA 30 Hour Safety Training Certification
- State of Michigan DEQ Certified Storm Water Operator (not active)
- ProCore Project Management
- State of Michigan Limited License Professional Counselor

Courses Taught

- CONM 116 - Construction Graphics
- CONM 117 - Introduction to Building Information Technology
- CONM 324 - Advanced Construction Computers
- CONM 423 - Professional Methods

Advisor Roles

- Advisor to Associated Schools of Construction Region 3 Student Competition
- Advisor for Laser Scan / BIM Capstone Project

Service Organizations

- Mel Trotter Golf Marathon of Hope Committee 2013-2017
- The Edge Urban Fellowship Golf Committee 2016-present
- West Michigan Minority Contractors Association 2010-2017

Professional Development

- Autodesk University 2017, 2016, 2015, 2014
- Associated General Contractors BIM Education Program 2013

Grants

- Timme Travel Grant 2018

Other Educational Experience

- Michigan Society of Professional Engineers Annual Meeting
  Building Information Modeling Presentation - May 2017

Experience

Ferris State University | Big Rapids, MI
Assistant Professor
January 2017 - Present

- Instruct students on how to use various construction related software including: AutoDesk Revit, AutoDesk Navisworks, AutoCAD, Sketchup, Earthworks, On Screen Takeoff, BlueBeam Revu, Microsoft Excel, Word, and PowerPoint
- Developed and implement curriculum for Building Information Modeling, laser scanning, sUAS (drones), various construction field technology, and other software programs
- Engaging industry experts into the classroom so students experience real world application of subjects

Adjunct Professor
August 2015 – January 2017

- Teaching CONM 324 - Advanced Construction Computers and CONM 117 – Introduction to Building Information Technology
- Developed and implement curriculum for Building Information Modeling, BlueBeam Software, Google Sketchup, and other software programs

Construction Technology Consultants | Hudsonville, MI
Owner/Lead Consultant
May 2017 – Present

- Construction Technology Consultants exists to provide innovative solutions to the challenges construction, architectural, engineering, and design firms are facing

West Michigan Virtual Design and Construction Collaborative | Grand Rapids, MI
Founder

- The West Michigan VD&C Collaborative is a group dedicated to driving innovation in the building and infrastructure industries by creating awareness around advanced technology.

Rockford Construction Company | Grand Rapids, MI
Preconstruction Manager / Estimator / Manager of Virtual Construction
May 2010 – January 2017

- Preconstruction services including estimating, budgeting, bidding, scope definition, and scheduling
- Create Conceptual Design, Schematic Design, Design Development and Construction Document budgets and estimates
- Develop, implement, and manage all aspects of Virtual Design and Construction and BIM including research and implement innovative processes and tools for VDC and BIM
- Minority contractor development for inclusion in Rockford Development Group projects

Bazzani Building Company | Grand Rapids, MI
Project Manager / Estimator
July 2008 – May 2010

- Budgeting, estimating, bidding, and building LEED certified commercial construction projects
- On site supervision of LEED certified commercial construction projects
- Project Management of LEED certified commercial construction projects
- Successfully collaborate with owners on design, budget, and sustainable concepts

FH Martin Constructors | Warren, MI
Project Manager
June 2003 – May 2008

- Responsible for estimating, bidding, contract management, project management, and construction scheduling of commercial projects
- Perform quantity takeoff estimates for all trades involved in the specific project
- Facilitate new technology into company office and field operations
- Create and deploy standard operating procedures for field and office operations

Frank Rewold and Son, Inc. | Rochester, MI
Project Manager / Project Engineer
January 1999 – June 2003

- Responsible for schedule, contract management, and construction budget of commercial projects
- Project Management of commercial construction projects ranging from 2 million to 13 million dollars
- Develop and implement operational functions with new and emerging technology

DeVries Construction Inc. | Grand Rapids, MI
Field Representative
May 1997 – January 1999

- Assistant supervision of construction crews and subcontractors performance on projects up to one million dollars

Skills

- Project management abilities such as plan reading, scheduling, contract negotiation, cost review, permitting processes, and digital take-off
- Capability to train others and present educational content in front of large groups
- Ability to find new and innovative technologies to assist in making operations more efficient and productive
- Experienced in many advanced construction software programs including: AutoDesk Navisworks, Autodesk Revit, AutoCAD, Google Sketch-up, BIM 360 Field, BIM 360 Glue, A360, D-Profiler, On Screen Take-off, Earthworks, BlueBeam, Assemble Systems, Plan Grid, Procore, Prolog, and Timberline Estimating

Professional Resume

Professor David J. Hanna

[illegible]

Master of Science, Environmental Engineering	1974
Rensselaer Polytechnic Institute	
Bachelor of Science, Marine Engineering	1972
United States Merchant Marine Academy	

[illegible]

1991 Joined the Construction faculty at Assistant Professor rank

1996 Promoted to Associate Professor

1997 Granted tenure with the Construction faculty, College of Technology

2001 Awarded a merit increase

2003 Service as department Chair (two year term)

2003 Distinguished Teacher Award

2005 Voluntary return to full-time faculty

2006 Promotion to Full Professor

2012 Awarded a merit increase

[illegible]

Construction Management-Big Rapids campus	BS degree
Construction Management-Grand Rapids campus (evenings)	BS degree
Building Construction Technology	AAs degree
Civil Engineering Technology	AAS degree
Surveying Engineering	BS degree
Heating Ventilating Air Conditioning	BS degree
Civil Engineering (within SURE Program)	BS degree

Assistant Professor, adjunct, Rensselaer Polytechnic Institute, 1987-1990

Responsible for all elements of senior and graduate level courses in environmental engineering, municipal infrastructure, and water resources. Industry representative as reviewer of senior capstone projects. Academic member of on-site ABET accreditation review team.

Instructor, adjunct, Southern Vermont College, 1990

Responsible for senior water resources course including hydraulics and hydrology in the Environmental Studies Program. Teaching assignment solicited by Southern Vermont College.

Assistant Professor, adjunct, State University of New York, 1976-1983

Responsible for courses in three academic programs: Engineering Sciences; Mechanical Engineering Technology; and Water Resources. Total teaching responsibility for 15 semester based engineering and technology courses.

Assistant Professor, adjunct-non-teaching, Syracuse University, 1979-1981

Industry reviewer of senior student projects in the Civil Engineering Department in the fields of engineering hydraulics, hydrology, water resources, and environmental engineering.

Licensed Professional Engineer (Registered six states, currently inactive)

Licensed Marine Engineer, U.S. Coast Guard, third Assistant Engineer for steam and diesel vessels of unlimited horsepower (currently inactive)

American Society of Civil Engineers

American Society of Mechanical Engineers

Mechanical Electrical Academic Instructors Consortium (Inactive)

United States Naval Institute

Certified Lay Speaker, Heartland District MI, United Methodist Church

Visiting Team Chair, American Council for Construction Education, Inactive

Visiting Team Member, American Council for Construction Education, Inactive

Value Engineering, USEPA and USGSA

Instructor, Operator Training Certification (pumping systems and hydraulics), Michigan Department of Environmental Quality, Inactive

Instructor, Bureau of Construction Codes, plans and specifications, Michigan Department of Labor, Inactive

[illegible]

Branch Office Manager, McClure Engineering Company, (1990-1991). Profit and loss responsibility for branch office including client management, project management, engineering, surveying, construction inspection, marketing and sales.

Associate and Project Manager, J.K. Fraser & Associates (1985-1990). Project manager for engineering and construction projects including construction management.

Project Manager, Ralph M. Parsons Co. (1983-1985). Project Manager for 120 million water treatment plant and industrial engineering projects. Company wide project and quality control re3viewer for all eastern half US projects.

Managing Engineer, Stearns & Wheler Engineers and Scientists (1979-1983). Managing Engineer for water and wastewater treatment plant projects, pumping stations and pipelines, and municipal infrastructure projects. Owner's construction representative with field and contract management responsibility.

Head Engineer, Calocerinos & Spina (1975-1979). Supervisor of hydraulic and process engineering team for municipal infrastructure projects.

Intern Engineer, DuBois & King Engineers (1974-1975). Engineer on civil infrastructure projects, developing flood event water surface profiles, author of a treatment plant operations & maintenance manual.

Line and Engineering Officer, U.S. Navy Reserve (1972-1978). Limited duty assignments as Engineering Officer in a Destroyer Squadron, US Atlantic Fleet. Assistant Damage control Officer battle station at sea.

Boilerman and Jumior Engineer, U.S. Merchant Marine Fleet (1969-1970). Sophomore year of USMMA engineering and naval education spent at sea. Evaluated engineering systems, operated and maintained propulsion and auxiliary system equipment, in addition to bridge and engine room watch standing duty. Academic work included 1) engineering analysis of ship propulsion and auxiliary systems, and 2) cultural observations of over 50 countries on four continents.

Construction and High Structure Worker, Furnish & Erect Ltd., (summer employment 1962-1968, 1972-1974). Steeplejack, ironworker, carpenter, laborer, and concrete worker on a wide variety of commercial and industrial building projects.

CONM 499 – Project Management in Construction (BS degree capstone course)

CONM 490 – Total Quality Management in Construction

CONM 490 – Special Topics in Construction Management (separate from above)

CONM 452 – Quality Assurance and Quality Control in Construction

CONM 451 – Value Engineering

CONM 430 – Power and Process Plant Construction

CONM 423 – Construction Management Professional Methods

CONM 422 – Construction Supervision and Safety

CONM 412 – Construction Contracts

CONM 389 – Total Quality Management and Partnering in Construction

CONM 323 – Issues in Construction Management

CONM 311 – Concrete Formwork and Temporary Structures

CONM 211 – Statics and Structures

CONM 113 – Computer Applications for Construction

CONM 112 – Plans and Specifications

CONM 111 – Construction Practices

CONM 100 – Introduction to Construction

CONM 100 – Exploring Construction (separate course from above CONM 100)

CONM 090 – Construction Orientation

BCTM 223 – Mechanical and Electrical Plans and Specifications

BCTM 225 – Field Engineering

BCTM 233 – Mechanical Electrical Plumbing Construction

CETM 327/CIV 171 – Hydraulics and Hydrology

CIV 201 – Statics and Strength of Materials

CIV 244 – Computer Applications in Construction

CIV 251 – Introduction to Hydrology

CENG 240 – Engineering Statics (calculus based)

CENG 321 – Engineering hydraulics (calculus based)

SURE 321 – Hydraulic Engineering

SURE 435 – The Urban Environment (BS degree capstone course site planning)

HVAC 337 – Mechanical and Electrical Systems for Buildings

ARC 123 – Structural Analysis

FSUS 100 – FSU Seminar

UNIV 290 – Freshman Orientation (Construction cohort)

Rensselaer Polytechnic Institute

Water and Wastewater Treatment Process Design

Air Pollution Control Systems Design

State University of New York

Statics and Strength of Materials

Water Supply and Treatment

Wastewater Systems Engineering

Southern Vermont College

Water Resources Engineering

Distinguished Teacher Award, Ferris State University, 2003

Nominee from Ferris State University, CASE Award for Outstanding Faculty to the Carnegie Association for Science and Engineering, 2002 and 2003

Outstanding Educator Award, Associated Schools of Construction, 1999

University Excellence Award, Ferris State University, 1998

Distinguished Teacher Award, Finalist with Distinction, Ferris State University, 1998

Outstanding Educator Award, Associated Schools of Construction, Great Lakes Region, 1997

Outstanding Teacher Award, American Society for Engineering Education, North Central Section, 1997

Dow Outstanding new faculty Award, American Society for Engineering Education, 1996

National Teaching Award, Associated Schools of Construction, (1st year of this award), 1995

Outstanding Service Award, College of Technology, Ferris State University, 1995

Special Recognition Award, New York State Society of Professional Engineers, 1989

Award of Merit in Concrete Design and Construction, American Concrete Institute, central New York Chapter, 1985 (project based award)

E.F. Martiny Award, New York Water Pollution Control Association, Central New York Chapter, 1981

The following seminars were developed and presented through the ICET, the external industry outreach organization of the (then) Construction Department at FSU:

Basic Statistics for QA/QC Acceptance Testing

Construction Process Control and Practical Statistics

Highway Construction Process Control Statistics

Statistical Concepts for Quality Assurance in Concrete Work

Use of the Metric System in Highway Construction

Served as an Instructor with the Continuing Education Division of the American Society of Civil Engineers from 1999 through 2018. Presented two day technical seminars for CEU credit on advanced topics in hydraulic design, pipeline design, pump station design, water and wastewater treatment plant design, hydrology, storm sewer design, drainage design, engineering ethics, and construction cost estimating.

Seminars, technical training, and design workshops for five separate firms, one port harbor authority, and twelve governmental authorities/jurisdictions on the following topics:

Ethics in the construction Industry

Construction Plans and Specifications

Interpreting Construction Documents for Building Inspectors

Storm Drainage Systems

Practical Application of TQM in Construction

Pumping Systems Design

Treatment Plant hydraulics

Pressure Piping and Valving

Design of Submersible Pumping Stations

Served as a professional instructor to the United Brotherhood of Carpenters and Joiners at their International Training Center in their Superintendents Training Program from 2005 through 2018. Over 50 half day training presentations on multiple topics including leadership in construction, mentoring in the construction industry, concreting and formwork, mechanical building systems, electrical building systems, plumbing systems, life safety building systems, managing the construction jobsite, construction administration, construction project management, working with subcontractors, managing complex projects, managing jobsite risks, dispute and crisis management, managing a diverse workforce, and understanding plans and specifications.

Primary author of the training materials for the first year of the California UA Residential Plumbing Apprenticeship Training Program. Material included performance and learning objectives, power point presentations, references, assignments, laboratory objectives, organizational materials, teaching time allocations, and examinations. Winter 2005 for the FSU University Center for Extended Learning.

Chapter author for the engineering text “Pumping Systems Design,” Butterworth-Heinemann Publishers. Text won the American Publishers Award for best technical reference the year after initial publication.

[illegible]

Worked with Fluor Corp. at their headquarters during summer 2007 to develop course and technical content for the (then) new FSU course power plant and process plant construction. This course was developed and written by D. Hanna to enhance the CONM curriculum and is the only course of its kind in the US.

Served as an assistant site superintendent for the Law Co. on a 10,000 square foot new commercial building (J.C.Penney) in the new Riverside Mall in Muskegon, MI summer 2000.

[illegible]

Engineering Education Australia (EEA) is solely responsible for the continuing education required of all licensed professional engineers in Australia. EEA solicited D. Hanna as a technical instructor on two engineering topics from 2010 through 2014 at four locations for each topic.

[illegible]

Served as an external tenure reviewer of the tenure portfolio of Assistant Professor M.M.McCRay of Oklahoma State University at the request of the Department Head of the Construction Department, 2009.

Served as an external tenure reviewer of the tenure portfolio of Assistant Professor E. Connell of East Carolina University at the request of the Department Head of the Construction Management Department, 2009.

Served as an external tenure reviewer and off-campus member of the faculty tenure committee of Assistant Professor H. Cooke of the Rochester Institute of Technology at the request of the candidate, 2007-2010.

[illegible]

Service as a faculty mentor and tenure committee chair for the following faculty at FSU from 2006 to 2018:

John Kantorowski, Construction Technology & Management

Robert Aamoth, Construction Technology & Management

Kurt Shinkle, Surveying Engineering

Sagar Deshponde, Surveying Engineering

Brian Becjek, Construction Technology & Management

[illegible]

Credit Course Work (FSU)

SURE 331 Ethics and Professionalism in Engineering and Technology

Non-Credit Course Work (FSU)

LITR 290	Old Testament as Literature
HIST 285	American Military History
HVAC 337	Mechanical and Electrical Systems for buildings
HVAC 331	Secondary Equipment Design and Selection
HVAC 499	Commercial HVAC design
MFG 489	Total Quality Management
ARC 123	Structural Materials and Systems

[illegible]

Successfully completed the following professional development activities with associated contact hours, many of which were at individual expense:

Project Management, 2016	(35 hours)
Treatment Plant Hydraulics, 2014	(12 hours)
Construction Administration, 2014	(15 hours)
Piping System Fundamentals for the Process Industry, 2012	(16 hours)
Motors and Pumps, 2011	(18 hours)
BIM Workshop, FSU, 2010	(3 days)
West Virginia Institute of Technology Annual Conference, 2010	(1 day)
Hydraulic Design of Storm Sewers, 2009	
Applied Ethics for Engineers I, 2009	
Applied Ethics for Engineers II, 2009	
Nuclear Power Making a Comeback, 2009	
Michigan Energy Conference, FSU	
American Concrete Institute 318-002 Building Code	(11 hours)
Piping Systems for HVAC	(40 hours)

Plumbing Systems Design	(40 hours)
Electrical Building Systems Design	(40 hours)
Learning, the Learner, and Teaching Methodology	(40 hours)
Test What You Teach, Teach What You Test	(24 hours)
FHWA Conference on Training Instructors	(16 hours)
FSU Faculty Summer Institute	(32 hours)
Field Evaluation of Pump Operating Systems	(16 hours)
Tips of the Teaching Trade	(16 hours)
ASHRAE Fundamentals of Water System Design	(3.5 CEU)
ASHRAE Centrifugal Pumps	(1.4 CEU)
BOCA Structural Plan Reviews	(16 hours)
BOCA Non-Structural Plan Reviews	(16 hours)
FSUS 100 Instructor Training	(24 hours)
American Society of Plumbing Engineers	(18 hours)
Teaching Critical thinking Skills, FSU	
Tips of the Teaching Trade, GSU	
Creative Problem Solving, FSU	

[illegible]

Construction Management Program

Chair, Construction Department, 2003-2005

M.S. Degree Development Committee, 2002-2005

Member Curriculum Committee, 1994-1996, 1997-1999, 2012-2013, 2015-2018

Developer, AAS in MEP degree track, 1994-2000 (not adopted)

Coach, Student Competition Teams, ASC Regional Conferences, 1992-2003

Faculty Advisor, construction students involved in the MCA student competitions, with HVAC advisor M. Feutz, 2003-2012 (?) (FSU team placed nationally in first ever construction student involvement)

Developer of multiple new courses, 2007-2018

Faculty Representative, Industry Advisory Board Committee on Student Enhancement, 2013-2018

[illegible]

American Society of Civil Engineers (ASCE)

Instructor, Continuing Education Division, 1999-2018

Member, Construction Institute

American Council for Construction Education (ACCE)

Chair, Training Committee, 2006-2008

Member, Accreditation Committee, 2007

Member, Executive Committee, 2007

Visiting team Member (On-site evaluator), 1999-2007

Visiting Team Chair (On-site team leader), 2009

Member, Task Force on Visiting Team Chairs Council, 2007

American Society for Engineering Education (ASEE)

Member, Construction Engineering Division

Member, Civil Engineering Division

Member, Architectural Engineering Division

Member, Engineering Ethics Division

Executive Committee Member, North Central Section, 1995-2000

American Society of Mechanical Engineers (ASME)

Member, Piping and Pressure Vessels Division

Member, Fluids Engineering Division

Member, Plant Engineering Division

Member, Pipeline Systems Division

American Society of Plumbing Engineers (ASPE), 1999-2009

American Society for Heating, Refrigeration, and Air-Conditioning Engineers, Inc. (ASHRAE), 1999-2010

Associated Schools of Construction

Co-Chair, Undergraduate education Committee, 1998-2000

Co-Chair, Regional Awards for Faculty Excellence, 1996-1997

Hydraulic Institute

Technical Reviewer, Hydraulics and Pump Standards, as needed basis volunteer

Curriculum Vitae

Jennifer Brooke Miller, P.E.

Education: Central Michigan University, Mt. Pleasant, Michigan

- M. Business Administration – 2004

Michigan Technological University, Houghton, Michigan

- B.S Civil Engineering

Professional: Registered Professional Engineer, State of Michigan

Professional Experience: **Ferris State University – Big Rapids, Michigan**
Assistant Professor – August 2017 through present date
Instructor:

- CONM 121 – Materials Properties & Testing
- CONM 221 – Statics and Structures
- CONM 311 – Formwork and Temporary Structures
- ARCH 223 – Statics and Structures

Northwood University – Midland, Michigan
Adjunct – August 2009 through May 2010.
Instructor:

- MTH 0980 – Developmental Mathematics
- MTH 1150 – College Algebra
- MTH 3100 – Calculus I

<u>City of Saginaw, Assistant City Engineer – Saginaw, MI</u>
November 2015 – August 2017
Engineering/Right of Way Division. Project engineer, manager, and inspector of project inclusive of bridges, roadway, traffic, parks, facilities, and cemeteries. Assist with day to day operations of the Division including design, construction, traffic maintenance, street cleaning, snow and ice control, pavement maintenance, bridge maintenance and repair, composting, brush collection, recycling, and forestry. Assist in Division purchasing, accounts payable, payroll and human resource maintenance, and budgeting. Construction engineer for MDOT LAP projects.

<u>Tri-City Groundbreakers, Inc., Senior Project Manager – Midland, MI</u>
January 2015 – November 2015
Performed MDOT, roadway, sitework and underground utility quantity take-off, cost estimates, and bid proposal submission. Responsible for project meetings. Responsible for the complete financial, schedule adherence, material ordering, productivity maintenance, and general project management. Responsible for invoicing, advanced scheduling (Primavera), project costing and monthly financial projections, and reports to clients.

Kraft Engineering and Surveying, Design Engineer – Flint, MI
July 2013 – January 2015
Design engineer for MDOT local agency and municipal projects including bridge, roadway, roundabouts, water main, sanitary and storm sewer, and private site design. Responsible for invoicing, advanced scheduling (Primavera), project costing and monthly financial projections, and design reports to clients. Complete civil design services and constructability reviews. Design/resident engineer and schedule and financial management on the KWA Project.

Waste Management, Resource Manager – General Motors - Bay City, MI
December 2011 – July 2013
Complete all new employee and annual training for all plant employees regarding waste and recycling including RCRA and USDOT Hazardous Material Handling. Coordinate, ship, manage, and complete all financial billings related to all plant waste and recycling including TSCA, Hazardous Waste, Scrap Metals, Recycling, Waste to Energy, and Medical Waste shipments. Maintain plant's Landfill Free status and monitor and promote plantwide compliance. Provide value added services and cost savings proposals including full implementation. Complete all project management, billing, and collections.
Ensure regulatory compliance including coordinating with MDEQ, EPA, and other State Regulatory Authorities. Coordinate all special waste including construction project generated waste.

AECOM, Senior Construction Project Manager – Lansing, MI
March 2009 – April 2011
Project leader for MDOT and municipal projects inclusive of scheduling, financial, and human resource management of consulting services during construction operations. Responsible for project proposal and report writing. Responsible for marketing Michigan Division construction inspection services. Provide on-site as-needed construction inspection and testing services and provide immediate on-site observation, evaluation, surveying, and engineering solutions to unexpected conditions. Maintain safety training and compliance for Lansing transportation staff, project Quality Assurance/Quality Control including ISO compliance, project environmental compliance. Complete civil design services and constructability reviews.

Fisher Contracting Company, Project Manager/Estimator – Midland, MI
2007- 2009 & 2001-2003
Performed environmental, remediation, sitework and underground utility quantity take-off, cost estimates, bid proposal submission. Responsible for planning, conducting, and documenting; marketing, strategic planning, partnering, progress, and final project evaluation meetings. Responsible for the complete financial, schedule adherence, productivity maintenance, and general project management of MDOT, environmental, industrial, municipal, and commercial projects ranging in size from $10 thousand to $22 million. Experienced with utilizing estimating, scheduling, financial, and CAD software. Simultaneously estimated and managed multiple projects of varied size and scope.

J. R. Heineman & Sons, Inc., Project Manager/Estimator – Saginaw, MI
2005- 2007 & 1993-1998
Project manager and estimator on big box retail projects, industrial, commercial, education, and municipal projects including projects in HSC, Dow Corning, General Motors, and Total Petroleum. Responsible for full subcontractor solicitation, subcontractor bid review, and final bid submission including hard bid, design-build, time and material, and negotiated project work on projects in size from $10 thousand to $18 million in size. Project Manager on J. R. Heineman team awarded HSC Supplier of the Year 1996.

Bartow & King Engineers, Project Manager/Design Engineer – Midland, MI
2003- 2005
Design engineer for new subdivisions, plats, roadway improvements, and landscaping projects including MDOT projects.

City of Midland, Landfill Superintendent – Midland, MI
1998 - 2001
Led City of Midland Landfill Department including financial, regulatory, and operations management including supervision of a staff of 10. Full budget forecasting and adherence including contract review, equipment specification and procurement, new construction and programs budgeting, and staffing utilization for a $3 million enterprise fund. Forecasting and planning of new programs utilizing staff to their fullest potential. Maintained regulatory compliance including utilizing effective communications with regulatory authorities. Provided environmental education to the public.

Honors: Member, Chi Epsilon – Civil Engineering Honor Society
Cum Laude, Michigan Technological University, 1993

Professional Development: Conferences, Seminars Participation:

- Train-the-Trainer TEA/STEM Workshop - 2018
- Infrastructure Finance Basics Workshop – 2017
- Transportation Asset Management Conference – 2017
- Road Safety: Traffic Safety Training for Local Officials – 2017
- Transportation Asset Management for Local Officals – 2017
- MDOT Office Tech Exam/Recertification – 2017
- SARA Title III Tier Two Workshop – 2017
- 2016 Field Manager & Contract Management Conference – 2016
- Asset Management Using Pavement Interlayers – 2016
- MERL Project Estimator – 2016
- Transportation Asset Management Workshop – 2016
- Introduction to Roadsoft – 2016
- Constructing for Pedestrian Accessibility -2016
- Concrete Pavement Preservation Workshop – 2016
- Legal Issues Symposium and Road Funding - 2016

Presentations:

- Women in CET Networking Faculty Panel Networking Night 2018

Awards: Women in CET – Outstanding Non-Traditional Team Award -

Certifications, Skills, Other:

- Competency in Microsoft Excel, Word, and Project; Primavera Suretrak and P6; Earthworks, CARLSON Suite (Civil, Cadnet, Trench, etc)., AutoCAD, Microstation, Pay Dirt, SiteWork, HCSS Heavy Bid & Heavy Job, ProjectWise, BS & A
- Project Manager Boot-Camp – PSMJ Resources, Inc.
- MDOT Prevailing Wage Audit Certified
- MDOT Paving Operations Certified
- MDOT Materials Source Certified
- MDOT FieldManager Certified
- MDOT Office Technician Certified
- CP-1 Protective Coatings Certified
- MDEQ Stormwater Certified
- Previously Held Certification Requiring Renewal
    - 40 HR HAZWOPER Certified, RCRA Hazardous Waste Certified, USDOT Hazardous Waste Certified, MDOT Level 1 Bituminous Lab Technician Certified, MDOT Nuclear Density Technician Certified, Great Lakes Safety Center Certified and held contractor entry badges for Dow Chemical, Dow Corning, and Hemlock Semiconductor

Curriculum Vitae

Suzanne Kohrs Miller

Education: University of Michigan, Ann Arbor

- M.S.E. Construction Engineering & Management – December 1997
- M. Architecture – December 1997
- B.S. Architecture – August 1994
- B.F.A. Industrial Design – August 1994

Professional: Registered Architect, State of Michigan
LEED-AP (BD+C)

Professional Experience: **Ferris State University – Big Rapids, Michigan**
Professor – August 2005 through present date
Program Coordinator – August 2013 through present date

- Recruiting
- Tours
- Program promotion
- Course scheduling
- Advising
- Michigan Construction Hall of Fame Committee – Lead organizer
- New student registration
- Rewrote our Industry Advisory Board Bylaws with a committee to reinvigorate members and achieve maximum effort and attendance
- Run Industry Advisory Board Meetings
- Attend Program Open Houses for the Grand Rapids cohort
- Advising/recruiting on the Grand Rapids campus at least once a month throughout the year
- Led the curriculum revision to align with new accrediting body's 20 student learning outcomes

Instructor:

- CONM 112 – Plans & Specifications
- CONM 116 – Construction Graphics (current)
- CONM 117 – Construction Building Information Technology (current)
- CONM 211 – Construction Quantity Estimating
- CONM 324 – Advanced Computer Techniques
- CONM 423 – Construction Management Professional Methods
- ARCH 323 – Structural Design
- OSHA Construction 30-Hour

Advisor:

- ASC Design-Build Student Competition (2008/10/11/12/13/14/15/16/17)
- NAHB Student Competition (2007/8/9)
- WIT (2006/7/8/9/10/11)

- Surveying Program Senior Seminar Project with Building Information Modeling and Laser Scanning 2016, 2018

Developed:
- Coursepacks for all 7 courses taught (CONM 112 and 116 are used by other instructors)
- CONM 116 – Construction Graphics – new course
- CONM 117 – Construction Building Information Technology – new course
- ARCH 323 – Structural Design – new course
- CONM 423 – Professional Methods (new focus on sustainability in 2008)

Member:
- Student Life Committee for the Academic Senate – 2006/7/8/9/10/11
- College of Engineering Technology Scholarship Committee – 2007-present
- Dean's Advisory Committee for the College of Engineering Technology – 2008/9
- General Education Committee – representative for the College of Engineering Technology - 2010 to present
- School of Built Environment Strategic Planning Committee - 2010/11
- United States Green Building Council Education Review Committee (ERC) – 2010/11/12
- SPARC (Strategic Planning and Resource Council) – representative for the College of Engineering Technology - 2012/13/14/15/16/17/18
- Dean's Search Committee - 2014
- Assistant Dean's Search Committee – 2014
- College of Engineering Technology Efficiency Committee - 2017/18
- University Strategic Planning Steering Committee - 2018

Special Assignments:
- Research summer school for the Provost (costs, classes offered, classes transferred in, internships, off-campus, course caps) – 2016-17
- Michigan Construction Hall of Fame – conduct interviews of inductees, design invitations, design programs, develop program content, write video narration and sequences, event planning – 2017-present

Miller Development, Inc.
Summer 2007/8/9/10/11/12/13/14/15/16/17
Complete contracts and certified payroll for a civil engineering firm that specializes in bridge construction. Assist with MDOT electronic bidding. Sporadic site supervision. Safety inspections. Limited experience running a backhoe, loader, and excavator. Taught OSHA 10 Hour training.

Clark Construction Company – Lansing, Michigan
Consultant – July 2006
Created a "Lessons Learned" database from multiple projects for Clark Construction Company for use throughout the company. To be used when setting up a project.

Lansing Public Schools 3-Year Bond Program
Project Manager – April 2004 – June 2005

Responsible for managing a 3-Year $67.5 million school bond issue in Lansing, MI including a new middle school. Management tasks included: planning, logistics, scheduling, estimating, bidding, supervision, and budget management. Specific task of increasing minority and local contractor involvement

<u>Barton Malow Company - Southfield, Michigan</u>
Whitmore Lake Public Schools 3-Year Bond Program
Project Manager – December 2003 through March 2004

Directly responsible for a $44 million construction bond issue project implementation under a "Construction Manager as Agent" contract that included a new 150,000 square foot high school designed to achieve the U.S Green Building Council's LEED (Leadership in Energy and Environmental Design) silver rating in addition to extensive renovations of existing facilities. At the time of my departure, the high school project was in the construction documentation phase with estimating completed and the elementary school renovation in the contract award phase.

Milan Area Schools 3 -Year Bond Program
Project Manager – January 2001 to March 2004 completion

Directly responsible for a $55 million construction bond issue implementation again under a Construction Manager as Agent contract that included a green-field site build of a 277,000 square foot high school in addition to concurrent extensive renovations at existing elementary and middle school facilities. The new high school included state of the art educational and laboratory wings as well as an 850-seat auditorium with fly space, swimming pool with diving well, and a three-station gymnasium with arena seating and elevated track. High quality materials and specific building requirements were specified by the Owner and achieved.

General project management responsibilities included six professional staff and managerial oversight responsibilities for over 45 contractors. The project included dual accountability to a Barton Malow Company Project Director and the Superintendent of Schools for Milan Area Schools as the Owner. The latter responsibility included monthly presentations, tours of the new facility and dialog with the School Board. Site contractor and architect interface included significant cost and timing decisions, negotiations, and budget control. The total project was completed on schedule within the budget objectives with high owner satisfaction.

Brightmoor Christian Church and School, Novi, Michigan
Project Engineer, Assistant Project Manager – September 1999 – December 2000

The GMP design-build project consisted of a 177,000 square foot new church construction with attached school. A unique project challenge included a $2.5 million budget reduction task at the end of the design phase. A specific team was created to complete the project at the lower cost. Job responsibilities included participation on the budget task team, bidding documents, management of submittals, careful field order and change order review, and closeout. Through a series of aggressive contract management and design decisions, the project was completed on time, and within the reduced budget target.

Raupp Elementary School, Lincoln Park, Michigan
Project Engineer and Superintendent – February 1998 – August 1999
As a recent college graduate, was given the opportunity to act as the project engineer and superintendent on a new 44,000 square foot elementary school for Lincoln Park School District. Construction occurred on the playground of the existing elementary school. Site logistics required strict management within a tight urban city block and immediate proximity to the existing elementary school.

Multiple Schools in Lincoln Park, Michigan
Summer Intern – May – August and part-time until December 1997
Managed multiple smaller renovation projects including roof replacements, boiler replacements, structural repairs, and construction of a new District central warehouse.

<u>Albert Kahn Associates, Inc. – Detroit, Michigan</u>
Intern Architect – Summers 1992, 1993, 1996. Full-time August 1995 – August 1996
Worked in both the design and the construction document development departments. Construction document development specifically included drafting building plans, elevations, sections, details, schedules required for a complete project and space planning. Projects included: Saint Mary's Hospital, Clinton Memorial Hospital, Sinai Hospital, Wyandotte Hospital, Providence Hospital, Ford Wixom Assembly Plant, Chrysler Warrant Truck Assembly, and Angell Hall renovation at the University of Michigan.

Honors: Member, Tau Beta Pi – Engineering Honor Society
Member, Sigma Lambda Chi – Construction Management Honor Society

Professional Development: Conferences, Seminars Participation:

- New to Ferris Faculty group (monthly meetings) – 2005 – 2006
- Distinguished Faculty Seminar – Ethics, Classroom Rapport – 2005
- Michigan Contractors Forum 2006
- Timberline Training and Educator's Summit (estimating software) (4 days) – June 2006
- International Construction Innovations Conference (2 days) – October 2006
- NAIT Conference (multiple seminars on technical education) (3 days) – November 2007
- International Builders Show (multiple seminars, typically on sustainable design/construction) (5 days) – 2008/09/10
- CONEXPO (multiple sustainable construction and contract topic seminars) (5 days) – March 2008
- ASC Division Conference (BIM training) – October 2008
- Ferris Connect training – August 2008
- ASC MEAC seminar (Mechanical/electrical boot camp) (2 days)– April 2009
- LEAN Construction Symposium(2 days) – May 2010
- LEED online class – (weekly) June-July 2010
- LEED webinar – "Credit-by-Credit Review" – June 2010

- Ethics Fundamentals – June 2010
- ASC conference - Oct 2010
- CONEXPO (multiple sustainable construction topic seminars) (5 days) - March 2011 and March 2014
- AGC BIM Certification parts 1-4 - April/May/June 2011
- Beck DProfiler training - May 2011

Continuing Education (required every 2 years for both the Michigan Architecture License and the LEED AP (BD+C) accreditation:
Fall 2014:

- Wood: A Natural Choice
- Climate Change
- Concrete Masonry in Green Buildings
- Cross Laminated Timber
- Data Driven - How owners can make more accurate assessments of their high-performance buildings
- Daylighting
- Designed, Sealed, Delivers – IAQ and the Building Enclosure
- EIFS
- Fire Protection In Wood Buildings
- Green Insulation
- Green Urban Design
- K-12 Design
- LEED 2009 Energy Performance Modeling and Energy Savings
- LEED and the EPA
- LEED Neighborhood Development
- Materials in Action
- Plumbing Products Go Green
- Precast Concrete for High Performance Building Envelopes
- Product Transparency Declarations
- Spray Foam Insulation
- Stone Veneers – Authentic and Appropriate Technology
- Stone Wool Acoustical Ceilings
- Style and Sustainability of Precast Concrete
- Tall Buildings
- Western Red Cedar
- Wood and Environmental Product Declarations
- Wood – Design is in the Details

Summer – Fall 2016:

- A New World of Acoustics
- Aluminum
- Beyond Airtight ness – Factors to Consider
- Building Materials Matter
- Building Resilience
- Cementitious Wood Fiber Board
- Cradle-to-Cradle

- Creating a New Path for Forest Products in Green Buildings
- Daylighting Design Update
- Designing for High Winds
- Disruptive and Green
- Fenestration
- Green Walls
- Harvesting Rain
- High Performance Coatings For Commercial Buildings
- High Performance Green Trends
- LEED – The Next Generation
- LEED v4 for Product Manufacturers
- Life Cycle Assessment for Appliances
- Managing Daylight with Automated Controls
- Masonry and LEED v4
- Metal Panel Cladding
- Performance Matters
- Providing Thermal Moisture and Fire Barriers in Harsh Conditions
- Rolling Doors – Closing the Gaps
- Shifts in Healthcare Design
- Sustainable Envelopes with Structural Engineered Panels
- Sustainable Extruded Aluminum Trim
- Sustainable Single Ply Roofing
- Sustainable Stone from Cradle to Gate
- Template-Assisted Crystallization
- The Impact of Wood on Sustainability
- The Impact of Wood Use on North American Forests
- Wood and Indoor Environment
- Wood and LEED v4

Grants: TIMME Grant to study 3-D modeling in the architecture and construction management industries over the summer of 2013 "Global design and construction of the built environment is rapidly changing. 2-D methodology for design, estimating, scheduling, and construction has rapidly expanded to electronic 3-D modeling, 4-D scheduling, and 5-D estimating. To remain relevant, our student must be familiar with how these technologies function in both the design and construction industries. To develop effective class projects and cross-disciplinary classes, a faculty member must fully understand how the systems operate in the workplace. This cannot be achieved through academic research or training class work alone. Real-time training and monitoring in the workplace provides the optimal solution and hence the purpose of this grant."

Presentations:

- "Superintending Skills" to Women in Construction program at Barton Malow Company
- `"Why Girls Should Take Math and Science Classes" at Macomb Intermediate School District Forum for 7th and 8th grade girls, 2000
- "Board of Education Workshop – Scheduling", "Board of Education Workshop – Change Management", "Board of Education – Bidding Process", Monthly updates of construction progress, monthly basis January 2001 – June 2005

- Michigan Construction Teachers Association in February 2014 on Ferris State University's Construction Management Program and how they can best prepare their students for college
- Hispanic Center Summer Visit 2014 – Conducted a session on mixing concrete which culminated in the creation of concrete candle holders for the students. I was assisted by John Kantorowski.
- Wayne County Counselors on Non-Traditional Careers in November 2014 on "Construction Management – Yes, It's A Real Degree."
- Multiple presentations at Muskegon Career Technical Center 8th Grade Career Days on how I arrived at a degree in Construction Management, my schooling, etc. 2012/14/15
- Multiple presentations with the HVACR Program throughout the state on STEM 2013/14/15/16
- Multiple presentations to female students to introduce them to construction management – 2014/15/16/17/18
- Presentation to Michigan Construction Teachers Association at their annual meeting on the Michigan Construction Forum and methods for bringing more students into construction – the trades and management - 2018
- Cadillac Wexford Careers for Women Conference – presenter to 140 female students about construction management as a career (and my path to get there) - 2018

Awards:

- College of Engineering Technology Outstanding Nontraditional Student Advocate – 2016 - Nominated/awarded by students for going above and beyond to support females within the College of Engineering Technology
- Twice nominated as Advisor of the Year for Ferris State University

Skills, Other:

- Full competency in Microsoft Excel, Work, and Project; Primavera Suretrak and P6; Earthworks, AutoCAD; SketchUp, and Revit
- Written presentation of three entries into the Construction Innovation Forum Nova awards, 2003
- Led the "Creative Solutions" badge workshop for the Girl Scouts – 2012
- Served as juror for senior Architecture student presentations – 2013/14
- Graduation Adjutant – Spring 2015/16/17/18; Fall 2017
- Represent Program at the majority of Admissions events 2013/14/15/16/17/18
- TEA (Teaching Engineering Aptitude) Event Facilitator – I typically run the Career Carousel to introduce females to engineering professions – 2015/16/17/18

JOHN J. POSILLICO

1568 Briarwood Way • Uniontown, Ohio 44685 • M: 234-303-5014 • posillico.john@gmail.com

OBJECTIVE

To obtain an Assistant Professor position within the College of Engineering Technology at Ferris State University.

TEACHING EXPERIENCE

Adjunct Faculty - University of Akron; College of Applied Science and Technology - www.uakron.edu
Akron, Ohio: August 2017 - Present

- Construction Supervision
    - Developed and taught an innovative curriculum for a new course within the department's construction degree program

Guest Lecturer - Concordia University; Department of Building, Civil, and Environmental Engineering - www.concordia.ca
Montréal, Québec, Canada: November - December 2017

- Construction Cost Estimating: Understanding Dynamic Bidding Processes
    - Presented advanced-level lectures to undergraduate and graduate students on the dynamic differences between bidding processes using in depth case study analysis

Guest Lecturer - Seneca College; School of Environmental and Civil Engineering Technology - www.senecacollege.ca
Toronto, Ontario, Canada: April 2017

- Introduction to Critical Path Method Scheduling and Primavera P6
    - Presented introductory-level lecture utilizing Primavera P6 software to analyze real project critical path method schedules

Guest Lecturer - Eastern Michigan University; College of Technology, Graduate Program - www.emich.edu
Ypsilanti, Michigan: March 2017

- Project Risk Analysis: A Focus on Restoration / Renovation Projects
    - Presented advanced-level lecture on the identification of specific project risks, along with appropriate mitigation techniques, inherent in restoration and renovation projects through interactive discussions

Guest Lecturer - Indiana University Purdue University - Indianapolis; School of Engineering and Technology - www.iupui.edu
Indianapolis, Indiana: March - September 2016

- Strategic Use of Presentations in Project Procurement
    - Presented lecture series based on the students' Capstone project presentations. Engaged students in active dialogue, including performance critiques, about the proper use of soft skills when presenting technical knowledge
- Construction Bidding and Award Processes
    - Presented introductory-level lecture on the various types of construction bidding techniques and contract awards, referencing a diverse set of current projects

Guest Lecturer - Michigan State University; School of Planning, Design, and Construction, Graduate Program - www.msu.edu
East Lansing, Michigan: March 2016

- Lean Construction: Offering Another Perspective
    - Presented an interactive and thought-provoking lecture on the application of Lean practices in construction management leadership and team building

Guest Lecturer - University of Cincinnati; College of Engineering and Applied Science - www.uc.edu
Cincinnati, Ohio: December 2015

- Schedule Risk Analysis: Broadening the Lens and Scope of CPM Schedules
    - Challenged students by utilizing advanced scheduling logic and analysis to apply schedule metrics to support interpersonal, team dynamics, and stakeholder project value

PROFESSIONAL EXPERIENCE

Project Manager - NV5, Inc. - www.nv5.com
Denver, Colorado: June 2015 - Present

- Act as the Owner's Project Manager to facilitate the development and recommendation of overall project scope, delivery method, master budget, schedule development, and ongoing team management for $10M - $360M healthcare projects across the United States
- Actively provide assistance and direction with managing multiple project stakeholders, general and subcontractor procurement processes, and project implementation
- Assist the translation of project complexities in ways that support executive, administrative oversight, and decision making
- Lead diverse teams in defining and maintaining project requirements to manage project risk while maximizing project value
- Guide project teams through the training and coaching of innovative project management controls theory and analysis

Project Manager, National Operations Group - Stuart Dean Company - www.stuartdean.com
Cleveland, Ohio: July 2013 - June 2015

- Solely responsible for the schedule, budget, and quality efforts for multiple, simultaneous $2M - $4M projects across the United States and Canada
- Successfully coordinated diverse and multi-discipline project teams across the United States and Canada
- Engaged in the education and mentoring of field personnel and Superintendents companywide
- Assisted in the development of interdepartmental, operations-focused communication efforts
- Established and implemented National Operations standard operating procedures that focused on sustainability, the elimination of waste, continuous improvement, quality, and operational strategy

Project Engineer - Consigli Construction Company, Inc. - www.consigli.com
Milford, Massachusetts: May 2009 - July 2013

- Acted as an integral member of a cross-functional team that included project, design, and owner executives
- Assisted project team in the documentation and control of contract change management, project schedules, work budgets, and cost reports for LEED Certified projects up to $62M throughout New England
- Supported the project team by researching, analyzing, and preparing numerous project control documents, including quantitative / qualitative reports and metrics
- Responsible for the management of the project's Project Engineering team

EDUCATION

Master of Science, Organization Leadership - Regis University - www.regis.edu
Denver, Colorado: April 2016

- GPA: 4.0, Graduate Honors

Bachelor of Science, Construction Management - Roger Williams University - www.rwu.edu
Bristol, Rhode Island: May 2010

- GPA: 3.7, Magna Cum Laude
- Minor: Business Management

PROFESSIONAL CERTIFICATIONS AND AFFILIATIONS

Project Management Professional (PMP) Certification	In Progress (anticipated Q1 2018)
IUPUI - CEMT Industry Advisory Board Member	2016 - Present
Lean Construction Institute	2016 - Present
Project Management Institute	2014 - Present
Lean Six Sigma (Yellow Belt Certification)	2014 - Present

CONSTRUCTION SPECIFIC SOFTWARE PROFICIENCY

- Primavera P6 and Microsoft Project (Critical Path Method Scheduling)
- Sage 300 (Construction Administration Management)
- BIM 360 Field (Integrated Field Management)
- AutoCAD (Drafting)
- Microsoft Office Suite (Word, PowerPoint, Excel, OneNote)

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Daniel D. Pratt
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EMPLOYMENT HISTORY

Ferris State University (Big Rapids, MI)

Assistant Professor – Construction Technology & Management	**2009 – Present**
Adjunct Professor – Surveying Engineering	2001 - 2006

Terra Pointe Consultants, Inc. (Grand Rapids, MI) **2010 – Present**
President

Driesenga & Associates (Grand Rapids, MI) **1998 - 2009**

Division Manager	2000 - 2009
Vice President	2000 - 2009
Director of Surveying Services	1998 – 2009

Moore & Bruggink, Inc. (Grand Rapids, MI) **1989 – 1998**

Project Manager	1995 - 1998
Crew Chief	1989 – 1995

EDUCATION

Michigan Technological University–
B.S. – Land Surveying, 1987
A.A.S. – Civil Engineering Technology, 1987

Western Michigan University –
M.B.A. – Management, 1999

Ferris State University –
Certificate – Real Estate, 2015

PROFESSIONAL DEVELOPMENT

Professional Surveyor, Michigan #39094, since 1993.
Michigan Society of Professional Surveyors, since 1988.
National Society of Professional Surveyors, since 2010.

Consulting Experience –

Since April of 2010, I have been President of Terra Pointe Consultants, Inc., a land surveying and consulting business I operate in Grand Rapids. I perform a variety of professional services based upon our client's needs. Below is a brief listing of projects we have completed.

- Perform monument preservation and establish geodetic control on numerous M.D.O.T. projects throughout Lower Michigan, working directly for the contractors.
- Perform monument preservation and establish geodetic control on numerous Kent County Road Commission projects.
- Perform boundary and topographic surveys for Kent County Parks Department.
- Perform boundary and topographic surveys for private developers of residential and commercial properties in West Michigan.
- Perform boundary and topographic surveys, prepare legal descriptions and easement documents for ITC, a national electric distribution company, for properties throughout the State of Michigan.
- Perform and prepare surveys for boundary dispute resolutions for National Due Diligence Services and Fidelity Title of Orlando, Florida.

By conducting this work outside of my normal teaching responsibilities, it gives me the opportunity to stay involved, and current in practices, with the surveying, construction and development communities. This allows me to bring back to the classroom, real life examples of what is currently taking place in our construction industry.

Presentations Made –

- *Construction Surveying Workshop*, Center of Technology & Training, Michigan Technological University, Howell and Kalamazoo, Michigan, April 2014.

- *Construction Surveying Workshop*, Center of Technology & Training, Michigan Technological University, Jackson, Ithica and Houghton Lake, Michigan, June 2015.

Continuing Education –

My career at Ferris State University began in August 2009. Since that time I have completed four courses here at Ferris, GISC225 – Principles of Geographic Information Systems, REAL210 – Principles of Real Estate, REAL305 – Real Estate Appraisal, and REAL330 – Real Estate Investment/Management. The completion of the last three courses resulted in my completion of a Certificate in Real Estate, at Ferris State University, in December, 2015.

Since August of 2009, I have attended and participated in several seminars and workshops which have totaled 145.5 hours of continuing education credits.

The following is a summary of the seminars that I attended in pursuit of my personal professional development.

- Building Information Modeling Workshop, College of Engineering Technology, Ferris State University, 21 hours. May, 2010.

- AutoCAD 2010 Core Concepts Training, Avatech Solutions, Chicago, Illinois, 24 hours. July 2010.

- The following seminars were presented by the Michigan Society of Professional Surveyors:
    - “The How, When and Why of a Surveyor’s Report” – 5 hour seminar 2011.
    - “Boundary Disputes and Resolutions” – 5 hour seminar 2011.
    - “Remonumentation Court Case” – 2 hour seminar 2011.
    - “Flood Zone Issues” – 2 hour seminar 2011.
    - “Geographic Information Systems – New Frontiers” – 2 hour seminar 2012.
    - “Professional Liability Claims” – 1 hour seminar 2012.
    - “Remonumentation, Platting and Condominiums” – 4 hour seminar 2012.
    - “ALTA Survey Standards and Issues” – 3 hour seminar 2012.
    - “Manitou Passage Benthic (Hydro) Survey” – 2 hour seminar 2012.
    - “Machine Control” – 3 hours seminar 2012.
    - “Relationship of Title Insurance and Surveys” – 1 hour seminar 2012.
    - “Techniques for Retracement of Historical Surveys” – 2 hour seminar 2013.
    - “General Land Office/ Bureau of Land Management” – 3 hour seminar 2013.
    - “Encroachment Resolution on Federally Managed Public Lands” – 1 hour seminar 2013.
    - “The Trial Court System” – 1 hour seminar 2013.
    - “Ethics for Land Surveyors” – 3 hour seminar 2014.
    - “Glass v Goeckel” – 3.5 hour seminar 2014.
    - “Amended Plats” – 1.5 hour seminar 2014.
    - “Act 591” – 2 hour seminar 2014.
    - “Riparian Law/Adverse Possession” – 2 hour seminar 2014.

- "Contracts/Liability" – 2 hour seminar 2014.
- "Remonumentation" – 1.5 hour seminar 2014.
- "So you want to be a Retracement Surveyor?" 1.5 hour seminar 2015
- "Corner Retracement in a Forest Environment" 1 hour seminar 2015
- "Roadwork Safety for Surveyors" 1.5 hour seminar 2015
- "MDEQ Bottomlands" 1.5 hour seminar 2015
- "Ferris State University Student Presentation"1.5 hour seminar 2015
- "Michigan Technological University Student Presentation" 1.5 hour seminar 2015
- "Corner Evidence Analysis" 3.5 hour seminar 2015
- "Surveyor Liability" 2.5 hour seminar 2015
- "Effective Marketing of Professional Services" 1.5 hour course
- "MDOT Alignment" 1.5 hour course
- "GEOCON 2.0" 1 hour course
- "LARA-REMON" 2 hour discussion
- "The Public Land Surveying System" 1.5 hours
- "Ferris State Student Presentations - Topographic Comparative Study" 1 hour comparative study
- "The Michigan Meridian" This 1.5 hour presentation
- "The Legacy of the Baseline and Michigan Meridian on the Cultural Landscape Of Michigan" 1.5 hours
- "Legal Descriptions" 1.5 hours
- "Business Aspects of Land Surveying" 1.5 hours
- "Ohio-Michigan Line" 1.5 hours -
- "Buried Treasure" 1.5 hours - Ground Penetrating Radar
- "New NGS Datums & Transformation Tools" 1 hour
- "Uh-Oh' The Construction Project Went Poorly: How Do I Protect Myself As A Surveyor When Things Go Wrong?" 1 hour
- "Easements" 2 hours
- "Surveyors Report" 3 hours
- "Expert Witness" 3 hours
- "Ferris State Student Presentations – Topographic Comparative Study" 1 hour
- "Ethics" 3 hours

PROFESSIONAL TEACHING EXPERIENCE

Courses Taught at FSU:

BCTM (CONM) 225	Field Engineering
CENG 421	Coils Engineering
CETM 215	Construction Equipment and Operations
CONM 122	Construction Surveying and Layout
CONM 212	Soils and Foundations
CONM 412	Construction Contracts

CONM 413 Construction Economics

ACADEMIC INVOLVEMENT OUTSIDE OF TEACHING

I have served on the following University committees:

- Library/Historical/Archival Committee
- Academic Policies and Standards Committee

I currently serve on the Construction Technology and Management Industry Advisory Board – Membership Committee.

Since my induction as an Honorary Member in November of 2012, I have served as the Advisor of Sigma Lambda Chi, the National Honor Society of Construction Management students. SLC, which stands for Society of Leaders in Construction, is dedicated to service in their program and community. The society offers free of charge tutoring to student in the program. They are also very active in performing community service projects in Big Rapids and throughout the area.

In 2011, 2013 and 2016, I served as the advisor for the Associated Construction Students – Heavy Civil Competition team, in Downers Grove, Illinois. The competition is an intense three days of students working as a team to complete a given task in some type of construction scenario. The teams must use their classroom and real life experience to solve, then present their solution, both in written and oral formats.

Since the Fall of 2012, I have been working with faculty in the Surveying Engineering program and Heavy Equipment program, to explore and develop a course or components is courses, in the topic of Machine Guided Grading, that would benefit students in all three programs. It has been identified that there is subject matter that overlaps all three programs, and the goal is to find a mechanism to present these topics to supplement the student's current studies.

COMMUNITY ACTIVITIES

Boy Scouts of America –

Eagle Scout – 1976
Committee Member of Boy Scout Troop #345
National Eagle Scout Association – Life Member
Eagle Scout Mentor
Merit Badge Counselor
Eagle Spirit District – Unit Commissioner
Eagle Spirit District – Eagle Board of Review

KELLY SEITTER, P.E.

Ferris State University
Construction Technology and Management Department
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Big Rapids, MI 49307
Office: (231) 591-2650
Email: seitterk@ferris.edu

Home Address:
23909 100th Avenue
Marion, MI 49665

Cell: (231) 884-1758

EDUCATION:

- Bachelor of Science in Civil Engineering, 1986
  Michigan Technological University, Houghton, MI
- Master of Science in Career and Technical Education, 2000
  Ferris State University, Big Rapids, MI

PROFESSIONAL CERTIFICATIONS AND REGISTRATIONS:

- Registered Professional Engineer (PE), Michigan #43640 – 1995 to present
- Registered Professional Engineer, Wisconsin #30816 – 1994 to 1998

PROFESSIONAL AFFILIATIONS:

- Michigan Infrastructure Transportation Association (MITA) – 1999 to present
- Asphalt Paving Association of Michigan (APAM) – 1997 to present
- MDOT Disadvantage Business Enterpriese (DBE) Conference – 2002 to 2012
- Michigan Construction Hall of Fame Selection Panel – 2008 to 2012
- Sigma Lambda Chi – Construction Honor Society – FSU Chapter - inducted 2002

ACADEMIC TEACHING EXPERIENCE:

Ferris State University, Big Rapids, MI.

College of Engineering Technology

Construction Technology and Management Department

- Professor – August 2008 to present
- Associate Professor – Academic Years 2003 to 2008
- Assistant Professor – Academic Years 1998 to 2003
- Adjunct Professor – Academic Year 1997 to 1998

ACADEMIC COURSES TAUGHT:

I am presently teaching, or have taught previously, the following courses:

- CONM 100 - Ferris State University Seminar
- CONM 113 – Computer Applications for Construction
- CONM 116 – Visualization
- CONM 121 – Material Properties and Testing
- CONM 212 – Soils and Foundations
- CONM 230 – MDOT Certifications in Aggregates, Density Control, Bituminous
- CETM 214 – Advanced Materials Properties and Testing
- CETM 215 – Construction Operations
- CETM 226 – Highway Technology
- SURE 421 – Soils Engineering for Survey Students

PUBLICATIONS:

Reviewed Seventh Edition of "Basic Construction Materials" by Marotta – 2006 – focusing on chapters relating to asphalt and aggregates.

Reviewed Sixth Edition of "Basic Construction Materials" by Marotta - 2004

Authored editorial for Michigan Contractor and Builder Magazine (MC&B) discussing careers in Construction and the program at FSU. This was the cover story for the December 2002 issue.

ACADEMIC SERVICE:

College of Engineering Technology Diversity Enhancement Committee
- Academic Year 2008 – present

University Diversity Enhancement Review Committee
- Academic Year 2008 – 2009

College of Engineering Technology Sabbatical Committee
- Academic Year 2004 – October 2008
- Chair of the committee – Academic Year 2006 to October 2008

University Sabbatical Committee
- Academic Year 2007 - 2008

College of Engineering Technology Marketing & Student Recruitment Committee
- Academic Years 2002 – 2004
- Subcommittee for COT Poster design - 2003

University Strategic Marketing & Enrollment Committee
- Academic Years 2002 - 2004

Senate Substance Abuse & Health Promotion Committee
- Academic Years 2000 - 2004
- Co-Chair of the Committee 2002 - 2004

Construction & Facilities Department Executive Tenure Committee
- Academic Years 2003 – present

STUDENT SERVICE:

- Organize student trips to APAM, MITA, and MDOT DBE Conferences – 1997 to present. Activities include FSU booth, introducing speakers, attending training seminars, providing assistance to organizations at the event.

- Coach of Heavy Civil Student Competition Team for the Associated Schools of Construction Region 3 Competition – 2000 to present. My role depends on the year as we often rotate it through several faculty.

- Women in Technology (WIT) – Faculty Advisor 2003 - 2011

- Spaghetti Bridge Competition – 2002 to 2014

SABBATICAL LEAVE:

I was granted by the University a one semester Sabbatical Leave Absence for Fall Semester 2009. The purpose of this leave was to visit companies that manufacture varied construction materials utilized in industry. The knowledge gained was then incorporated into coursework, disseminated to other faculty, and a report on the endeavor prepared. The companies visited:

- Alro Steel Plant J2 – Jackson MI – Plate Processing
- Alro Steel Plant JX – Jackson MI – Distribution and Finishing
- Belden Brick – Canton OH – Brick Manufacturing
- Besser Corporation – Alpena MI – Masonry Manufacturing Plants
- Biewer Sawmill – McBain MI – Timber Products
- Douglas Steel – Lansing MI – Steel Fabricator
- Indiana Limestone – Bedford IN – Dimension Stone Production
- LaFarge Cement – Alpena MI – Cement Production
- Steel Dynamics – Butler IN – Steel Mill
- USDA Forest Service Testing Laboratory – Madison WI – Timber Testing
- Weyerhauser Strand Technologies – Grayling MI – OSB Plant

CONTINUING EDUCATION:

- Concrete Joint Design Workshop by ACI – May 2016
- Great Teachers Workshop – May 2015
- Officer of Inspector General (OIG) National Fraud Awareness Conf – July 2008
- The Masonry Society Professor's Training – University Louisville - March 2007
- University Wisconsin Structural Design for Non-Structural Engineers – Nov 2006
- PCI Pre-cast Concrete Seminar – October 2006
- University of Wisconsin Structural Steel Connections – May 2006
- University of Wisconsin Geotechnical & Foundation Eng. – July 2005
- Troxler Nuclear Gauge Safety Training – October 2004
- World of Asphalt –March 2003
- MDOT Bituminous Technician - April 2003
- MDOT Certified Density Control - February 2003

- MDOT Certified Aggregate Technician - January 2003
- Lilly Conference - September 2002
- FSU Summer University – June 2002
- Paving Operations Course at ICET –March 2002
- Volumetric Mix Design Fundamentals – Feb 2002
- Lilly Conference – September 2001
- General Introduction to Web CT – May 2001
- ACI Practical Concrete Materials – March 2001
- Microsoft Office, Career Track – September 2000
- Critical Thinking – Basic Theory & Practice – July 2000
- Asphalt Professor Training Course – June 2000
- Academic Advising Training Session – October 1999
- Transportation Projects & Environment – October 1995
- Urban Drainage Design – May 1994
- AASHTO Roadside Design Training – October 1990

PROFESSIONAL WORK HISTORY

EXPERT WITNESS EXPERIENCE:

Parsons Rinsgmith, Traverse City, MI – 2004 to 2009 (part-time while teaching)
The case being disputed regarded construction site issues which resulted in the paralysis of a worker. I served as an Expert Witness in regards to the soils and construction.

Mid Michigan Engineering and Survey, Big Rapids, MI, – 1999 to 2001 (part-time)
Reviewed soil and aggregate samples from a gravel road where a vehicle lost control and an accident occurred. Tested soil samples, and provided information relating to the accident and roadway construction.

CIVIL ENGINEERING EXPERIENCE:

I have functioned as an engineer (staff engineer to project manager) at all levels of project development, and all phases of transportation projects including design, construction, and maintenance operations. The bulk of my experience was serving as a Project Manager overseeing a crew in the design, maintenance, and construction of highway facilities and bridges. My engineering experience is listed below:

Wells Mansfield, Traverse City, MI – 2000 to 2003 (part-time)

Provided oversight and guidance in obtaining certifications from M-DOT in the consultant categories of construction services, design services, and survey services.
Consultation in various engineering needs as they arise.

Mid-Michigan Engineering and Survey, Big Rapids, MI, – 1999 to 2001 (part-time)
Provided oversight and guidance in obtaining certifications from M-DOT in the consultant categories of construction services, design services, and survey services.
Assisted in varied design and construction projects, plan review and development

Gordie-Fraser and Associates, Traverse City, MI – 1997 to 2000 (part-time)
Engineering coordination and plan review for roadway projects.
Lead younger engineer in proper direction for design activities.
Review plans for proper adherence to design and construction standards and criteria.

Wilcox Associates, Cadillac, MI - 1995 to 1997
Consulting engineer in the design and construction of transportation projects for MDOT and County Road Commissions, working on multiple projects concurrently.

State of Wisconsin, Department of Transportation, Wisc. Rapids, WI - 1986 to 1995
Project Manager in Roadway Design, Construction and Maintenance. Directed a crew of engineers and technicians in the development and construction of roads, bridges, rest areas, drainage facilities.

Continuing Education while employed as a Civil Engineer:

- Transportation Projects and the Environment (DNR/DEQ & LTAP)
- Quality Based Leadership (WDOT)
- Low Cost Methods for Improving Traffic Operations on Two-Lane Roads
- AASHTO Roadside Design (FHWA)
- Roadway Safety Design
- Erosion Control Workshop
- Work Zone Traffic Control
- Urban Drainage Design (FHWA)
- Bicycle Facilities Planning & Design

Employment which was technical in nature while I was a college student:

Michigan Technological University, Houghton, MI – Summer 1985
Research assistant in the Civil Engineering Department. Projects involved analysis of gas samples to determine levels of certain compounds, and documenting the results. Research Assistant responsible for independent analysis and testing of samples.

Soil Conservation Service, East Tawas, MI – Summer 1984
Assistant to the District Conservationist for the Soil Conservation Service in Iosco County, MI. Projects involved significant surveying, data collection, and hand drafting of necessary information.

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CURRICULUM VITAE

ACADEMIC WORK HISTORY

Associate Professor
Ferris State University (August 2003 to Present)
Assistant Professor
Ferris State University (August 1996 to August 2003)
Professor in the Construction Technology & Management Program
Responsible for coursework in Advanced Construction Scheduling; Advanced Computer Techniques in Construction; Field Engineering; Computer Applications for Construction; Construction Estimating; and Construction Administration.

Graduate Teaching Assistant
University of Michigan (January 1982 to May 1985)
Graduate Teaching Assistant in the Civil Engineering Department
Responsible for the coursework in Critical Path Method Scheduling, responsible for the laboratory work in Civil Engineering Materials, and responsible for consultation and grading in Construction Contracting, and Construction Site and Equipment Selection.

EDUCATION

Postgraduate Studies - Civil Engineering, University of Michigan, 1983 to 1985
Master of Science in Engineering - Construction Engineering & Management, University of Michigan, 1982
Bachelor of Science in Civil Engineering - Construction, University of Michigan, 1981

PROFESSIONAL LICENSES

Licensed Professional Engineer: Michigan (#036907)

AWARDS & HONORS

Associated Schools of Construction - National Excellence in Teaching Award, 2017

PROFESSIONAL ASSOCIATIONS & SOCIETIES

American Society of Civil Engineers, 1997-2007, 2014-2017
American Society of Engineering Education, 1997-2002
Construction Association of Michigan
- Member, Young Executives Committee, 1992-1994
- Member, Doubles Classic Committee, 1988-1996

Engineering Society of Detroit, 1989-1999
Associated General Contractors
- AGC of America National
  - Member, Construction Education Committee, 2008-2015
- AGC of Michigan Chapter
  - Chairman, Computer Implementation Task Force, 1994-1996
  - Member, Education Committee, 1995-1996, 2004-Present
  - Judge, Build Michigan Award Committee, 2004-Present

Michigan Construction Hall of Fame Selection Committee, 2003-2004, 2010-Present
Michigan Construction Industry Professional Education Council, 1999-2003

Michigan Society of Professional Engineers/NSPE, 1997-2010
Treasurer, Big Rapids Engineers, 1999-Present
Naval Reserve Association, Life Member, 1993
Sigma Lambda Chi, 1999-Present
Society of American Military Engineers, 1993-2005

PROFESSIONAL WORK HISTORY

Project Manager, Erickson & Lidstrom Construction Co., 1991-1996
Project Coordinator and Project Manager, Kirco Realty & Development, Ltd., 1986-1990
Project Engineer, Utley-James, Inc., 1985-1986

MILITARY SERVICE

United States Naval Reserve, Civil Engineer Corps, 1983-2006
Retired Rank: Commander
Past Billets: Readiness Command MIDWEST Facilities Officer, Voluntary Training Unit Member, Contingency Engineer, Facilities Design Officer, Battalion Training Officer, Regimental Administrative Officer, Battalion Assistant Operations Officer, Company Commander, Material Liaison Officer, Engineering Officer, Assistant Training Officer

ACADEMIC INVOLVEMENT

University
Member, Faculty Athletic Advisory Committee, 1999-2008, 2010-2011, 2012-Presnt
Secretary, 1999-2000
Chair, 2000-2003, 2012-2013, 2014-2016
Vice-Chair, 2005-2006, 2010-2011, 2013-2014
Member, Search Committee – Career Services and Volunteer Center Coordinator, 2014-2015

College
Member, Information Technology Advisory Group, 1998-1999
Member, Curriculum Committee, 2002-2005, 2008-2014
Member, Promotion Committee, 2004-2008
Chair, 2006-2008

School
Member, Curriculum Committee, 2009-2014

Construction Department
Member, Construction & Facilities Department Computer Committee, 1997-1999

Construction Technology & Management Program
Coordinator, Construction Technology & Management Computer Lab, 1997-2002
Faculty Advisor, Associated Construction Students, 1997-Present
Coordinator, Construction Management Industry Scholarship Golf Outing, 1999–Present
Faculty Advisor/Coach, ASC Region 3 Student Competition Commercial Division, 2006-Present
Faculty Advisor/Coach, ASC Region 3 Student Competition Heavy-Civil Division, 2006
Organizer/Secretary, Construction Management Alumni Association, 2006–2010

National Summer Transportation Institute (FHWA / Michigan Department of Transportation Grant)
Director and Instructor, 2015-2017

CIVIC INVOLVEMENT

City of Big Rapids Zoning Board of Appeals
Member, 1997-2004, Chair, 2000-2004
Big Rapids Little League
Coordinator, 2003-2005, Assistant Coach, 2003-2008
Big Rapids Area Junior Hockey Association
Mites Assistant Coach, 2004-2005, Squirt Assistant Coach, 2005-2006
Big Rapids Figure Skating Club
Registration Program Developer, 2004, 2005, Treasurer, 2005-2010
Cub Scout Pack 3114, Big Rapids
Bear Den Leader, 2004-2005, Webelos Den Leader 2005-2007, Cubmaster: 2006-2008
Boy Scout Troop 114, Big Rapids
Assistant Scoutmaster, 2008-2009, Scoutmaster, 2009-2013, Treasurer, 2013-Present
Hillcrest PTO
Co-President, 2004-2005, Treasurer, 2005-2007
Big Rapids Middle School,
MATHCOUNTS Coach, 2009-2012

SEMINARS & PRESENTATIONS TO INDUSTRY & PROFESSIONAL SOCIETIES

Primavera Project Planner as a Management Tool, Public Works Department - NSA Rota, SP, 1997
Entry Level Project Management, Construction Association of Michigan, 1997-1999
SureTrak Project Manager 1.5 Workshop, Parliament Company, 1997
Computers - Technology in Construction, Constructor Development Program, Michigan AGC, 1998
Contract Documents and Construction Law Supervisory Training Program, Michigan Chapter AGC, 1998
SureTrak Project Manager 2.0 Workshop, Haussman Construction, 1998
SureTrak Project Manager 2.0 Seminar, Public Works Department - NSA Rota, SP, 1998
Managing the Project: The Supervisor's Role, Supervisory Training Program, Michigan Chapter AGC, 1998
AutoCAD 14 Primer, Public Works Department, NAVSTA Roosevelt Roads, PR, 1999
SureTrak Project Manager 3.0 Seminar, Charleston Field Office, NAVFAC, 2000
Transition Task Force Member, New Pacific Command Headquarters Project, Camp Smith Hawaii, 2001
Microsoft Project Training Seminars, Ferris State University Information Systems & Telecommunications, 2002
CPM Primer and Advanced CPM Techniques Satellite Broadcast, Southern Division, NAVFAC, 2002
Microsoft Project Training Sessions, Southern Division Headquarters, NAVFAC, 2002
SureTrak Project Manager 3.0 Training, Beaufort Field Office, NAVFAC, 2002
Government Construction Representative/Inspector, Resident Officer-in-Charge Construction, Guam, 2003
Executive Briefing Panelist, Constructware, 2003
Scheduling Consultant, Gundlach Champion, Inc., 2003-2005
Government Construction Representative/Inspector, Resident Officer-in-Charge Construction, Guam, 2004
Estimating Expert Witness Consultant, Romain, Kuck, & Egerer, P.C., 2005
Scheduling Consultant, Clark Construction, 2006
Scheduling Consultant, Walsh Group, 2007-2009
Education Consultant, Ironworkers Management Progressive Action Cooperative Trust (IMPACT), 2011
Contractor College Webinar, Ironworkers Management Progressive Action Cooperative Trust (IMPACT), 2011-2012
Summer Estimating Seminar, Ironworkers Management Progressive Action Cooperative Trust (IMPACT), 2012-2013
Scheduling Consultant, Feyen-Zylstra, 2012
Scheduling Consultant, Nestles Inc., 2012
Scheduling Consultant, Team Elmers, 2015
General & Specialty Contractor Dynamics, Supervisory Training Program, Michigan AGC, 2015

PUBLICATIONS

A Practical Guide for Planning and Scheduling Construction Projects, 2007
Ironworker Contractor College Webinar, IMPACT 2011-2012
Effective Project Closeout – Start with the End in Mind, Builders Exchange of Michigan Quarterly, Summer 2015
Effective Project Closeout – Guarantees and Warranties, Builders Exchange of Michigan Quarterly, Fall 2015

PROFESSIONAL MEETINGS AND CONFERENCES

Detroit Chapter/Michigan Chapter, AGC Student Contractor Awareness Night, 1996-1999, 2001-2006
Detroit Chapter/Michigan Chapter, AGC Student Contractor Awareness Night Table Captain, 2001, 2003
Detroit Chapter/Michigan Chapter, AGC Student Contractor Awareness Night Emcee, 2005
Michigan Chapter, AGC Winter Meeting, 1996-1997, 1999-2006
Michigan Section, ASCE, Annual Meeting, 1997
Construction Safety Day, 1998, 2000-2001, 2003
AGC National Convention, 1998, 1999, 2001-2003, 2005, 2007, 2016
AGC Educators Meeting, 1998-1999, 2001-2006, 2008-2018
AGC of Michigan Annual Winter Meeting, 2008, 2010-2018
AGC of Michigan, AGC Student Contractor Awareness Night, 2008-2018
ACCE Construction Education Forum, 1999
CONEXPO, 1999, 2002, 2005, 2017
Michigan Construction Industry Professional Education Council, 1999-2000
Michigan Road Builders Association, Winter Meeting, January 2000
Timberline Educators Conference, 2000, 2002
AGC National Mid-year Meeting, 2005, 2006
Critical Business Analysis Primavera Users Group Meeting, April 2002
AGC National Construction Education Committee Meeting, 2003, 2005, 2007, 2008
Associated Schools of Construction (ASC) Region 3 Conference, 2006-2017
Associated Schools of Construction (ASC) International Conference, 1998, 2017, 2018
Construction Association of Michigan (CAM) CAMEXPO 2009, 2012-2018
Michigan Construction Career Days, 2013-2018

PROFESSIONAL DEVELOPMENT & TRAINING

Project Delivery Systems, Construction Association of Michigan, 1987
Mechanical Blueprints and Specifications, Construction Association of Michigan, 1988
Total Quality Leadership, United States Naval Reserve, 1995
Leading a Project, Construction Association of Michigan, 1995
Planning & Scheduling with P3, Primavera Systems, Inc., 1997
Resource and Cost Analysis, Primavera Systems, Inc., 1997
Food for Thought Series, 1997
Project Management - Effective Communication, AGC National Convention, 1998
Food for Thought Series, 1998
Ferris Summer Institute, 1998
Cost Controls, AGC National Convention, 1999
Storyboarding Methods, AGC National Convention, 1999
Estimating with Precision Extended, Timberline Educators Conference, 2000
Project Management – Effective Meetings, AGC National Convention 2002
Project Management – Scheduling Changes, AGC National Convention, 2002
Primavera Expedition 9.0 Product Briefing, 2003
Building Information Modeling: Planning, Design, and Legal Considerations Webinar, 2008
Building Information Modeling (BIM) Education Program, AGC of America, 2011
Primavera P6 Training, Critical Business Analysis, 2013
LEAN Construction Workshops Units 1-4, AGC of America, 2014

<u>COURSES TAUGHT</u>

Ferris State University	BCTM 225 - Field Engineering CONM 113 - Computer Applications for Construction CONM 116 - Construction Graphics CONM 211 - Construction Estimating I CONM 222 - Construction Administration CONM 312 - Construction Scheduling CONM 321 - Construction Estimating II CONM 324 - Advanced Construction Computer Techniques CONM 423 - Construction Management Professional Methods CONM 499 - Construction Project Management
University of Michigan	CE 351 - Civil Engineering Materials (Laboratory Instructor) CE 431 - Construction Contracting (Grader/Assistant) CE 432 - Construction Engineering (Grader/Assistant) CE 536 - Critical Path Methods (Instructor)

APPENDIX B

Ferris State University
College of Engineering Technology

Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Ferrell Clark

Course: CONM 111 Construction Practices

Credits: 3 Hours

Contacts: 2 Lectures, 3 Lab Hours per Week.

Course Description: Exposure to materials, methods and equipment used on heavy and commercial construction projects. Site layout, foundations, structural components of a project, quantity takeoff, material ordering and basic construction codes are introduced.

Course Prerequisites: None

Course Co-requisites: C- in MATH 110 or higher or math ACT 19+/SAT 500+

Required Textbooks: "Principles and Practices of Heavy Construction", Woods, Smith and Andres Ninth Edition

Required Materials:

Hard Hat	Safety Glasses	Heavy Shoes
Hearing Protection	Claw Hammer	Calculator
12' Steel Tape	Pencil	

Supplemental Materials:

Lock	Gloves	Hammer Holder

Course Learning Outcomes

1) Apply methods of structure layout (ACCE SLO#11)
2) Demonstrate an understanding of materials, methods and basic equipment of construction (ACCE SLO #8).
3) Demonstrate basic crew safety (ACCE SLO#3)
4) Prepare basic quantity take offs of materials.

Assessment Methods:

ACCE SLO #3 Create a construction safety plan.
Assignment: create a construction task safety plan

ACCE SLO #8 Analyze methods, materials, and equipment used to construct a project.
Assignment: Determine the materials and equipment required to complete a concrete project

ACCE SLO #11 Apply basic surveying techniques for construction layout and control.
Assignment: Using the proper equipment, determine a basic project layout

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	Lecture Hours	Lab Hours	CLO(s)
1.	Introduction, Orientation, and Safety.	2	2	3
2.	Site Layout.	3	6	1
3.	Construction Equipment.	3	1	
4.	Piling and Foundations.	3	1	2
5.	Concrete Footings and Slabs	3	1	2
6.	Vertical Formwork and Columns.	3	4	2
7.	Horizontal Formwork.	3	6	2
8.	Masonry.	4	3	2
9.	Structural Steel.	4	4	2
10.	Evaluations	2	2	
	Total Hours	30	30	

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Ferris State University

College of Engineering Technology

Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

Topic	CLO(s)
1. Introduction, Orientation, and Safety. A. explain the course goals, attendance and grading policies. B. follow the general lab safety rules, tool and equipment operation and safe work habits.	3
2. Site Layout. A. demonstrate the setup and use of transit and laser lever. B. understand project layout and leveling	1
3. Construction Equipment. A. recognize the basic types of construction equipment. B. describe the factors that affect equipment production.	
4. Piling and Foundations. A. describe various types of piling B. identify the various foundation systems.	2
5. Concrete Footings and Slabs A. define the different methods of forming concrete footings and slabs. B. list the quantity of concrete and rebar from a set of plans. C. list the different methods and equipment used to place concrete. D. explain the importance and methods of curing concrete.	2
6. Vertical Formwork and Columns. A. identify the formwork components for vertical walls and columns. B. define the requirements for the vertical formwork. C. compare fabricated formwork with manufactured formwork.	2
7. Horizontal Formwork. A. identify the formwork components for an elevated slab. B. compare fabricated formwork with manufactured formwork.	2
8. Masonry. A. describe the materials and methods of masonry construction. B. designate basic acceptable masonry construction procedures.	2
9. Structural Steel. A. classify structural steel shapes and nomenclature. B. demonstrate structural steel connections using proper tools and methods. C. identify basic steel erection hand signals.	2

Ferris State University
College of Engineering Technology

Course Outline

Last Revision Date:	October 2016
Program CurrCoordinator:	Suzanne Miller
Drafted by:	Suzanne Miller

Course: CONM 112 Plans and Specifications

Credits: 3 Hours

Contacts: 2 Lecture Hours per Week, 2 Lab Hours per Week

Course Description: Introduction to reading plans and specifications for commercial/industrial buildings and heavy civil projects. Plan reading skills, construction document components, basic construction codes and basic quantity takeoff are emphasized.

Course Prerequisites: CONM 116; MATH 115 with a grade of C- or better or math ACT 24+/SAT 580+

Required Textbooks: **Printreading for Heavy Commercial Construction, 4th Edition**, Leonard P. Toenjes

Required Materials: Coursepack by instructor
Plans and Specifications for the Program's designated project (which are updated periodically)
MDOT Standard Specifications, Standard Details; Road and Bridge Bid Documents, Road and Bridge Plans

Student Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

1. Identify specific dimensions, locations, installation, and material requirements on commercial and industrial project plans and specifications (ACCE SLO#7)
2. Perform very basic quantity takeoffs from commercial and industrial construction plans
3. Identify the components of road and bridge construction
4. Explain the design process and how plans and specifications are intricately related.
5. Accurately read an architectural and an engineering scale.

Assessment Methods:

ACCE SLO #7 Analyze construction documents for planning and management of construction processes.
Test-Internal: Identify construction materials required for a project using a set of plans and specifications.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS	LAB HOURS
I.	Introduction and Procedures		1	
II.	Scales		2	
III.	Plan Reading	1	1	
IV.	Technical Specifications	1	2	2
V.	Construction Documents	1	1	1
VI.	Earthwork and Foundations	1	2	2
VII.	Concrete Construction	1	2	3
VIII.	Masonry Construction	1	2	2
IX.	Steel and Light Steel Construction	1	2	3
X.	Carpentry and Roofing Construction	1	2	2
XI.	Interior Finishes	1	2	3
XII.	Construction Codes		2	
XIII.	DOT Standard Plans and Specifications	1	2	2
XIV.	Heavy Civil Project Documents	1	2	1
XV.	Heavy Civil Plan Basics and Layout	1	2	4
XVI.	Evaluations		2	
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

I.	Introduction and Procedures A. Discuss the course objectives B. Explain the assignment procedures
II.	Scales A. Demonstrate proficiency in determining lengths of lines using architectural and engineering scales
III.	Plan Reading A. Describe the types of drawings and the information shown on the drawings B. Identify the sequence of drawings C. Explain the plan view interrelationships D. Identify the symbols and notations E. Interpret sections and details F. Perform a basic quantity takeoff from the site plan
IV.	Technical Specifications A. Describe the major divisions of the technical specifications B. Explain the specification format C. Search the specifications for specific information
V.	Construction Documents A. Identify the components of the project manual B. Describe the construction and contract document forms
VI.	Earthwork and Foundations A. Identify the different types of foundation systems B. Identify the type of utilities to be installed according to plans C. Identify components of underground utility services D. Determine the depths of utility services E. Determine the slope of a site F. Identify soil erosion control measures
VII.	Concrete Construction A. Identify the proper location for reinforcements B. Describe the types of concrete C. Determine the concrete requirements from the specifications D. Name the various concrete formwork systems E. Perform a basic quantity takeoff of concrete from a drawing
VIII.	Masonry Construction A. Identify the masonry components and shapes B. Find the masonry installation procedures in the specifications C. Determine locations and sizes of masonry units on the plans
IX.	Steel and Light-Gauge Framing

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Course Outline

	A. Identify the shapes and connectors for structural steel framed buildings B. Identify lintels in masonry construction with their appropriate steel shapes and sizes C. Interpret the steel drawings D. Perform a basic steel member takeoff of the roof
X.	Carpentry and Roof Construction A. Identify wood framing members B. Determine where wood is to be installed according to the plans C. Determine the type of roofing system to be installed according to the plans
XI	Interior Finishes A. Demonstrate the ability to use room finish schedules to determine how a room will appear upon completion B. Identify any submittal requirements for interior finish materials including samples and extra materials C. Complete quantity takeoffs of interior materials
XII.	Construction Codes A. Describe the types of building codes B. Describe the different inspections required for commercial buildings C. Search a basic building code
XIII.	DOT Standard Plans and Specifications A. Search the DOT website for standard plans and specification information pertinent to all DOT projects in general B. Read the details of a set of standard plans referenced on a set of project plans C. Search for applicable plan details
XIV.	Heavy Civil Project Documents A. Search a DOT website for bid letting information B. Describe the procurement process for a heavy civil projects C. Explain the format and layout of project documents
XV.	Heavy Civil Plan Basics and Layout A. Describe highway, bridge, transportation mapping B. Identify the stationing and alignment from a highway plan C. Read and interpret a topography and grading plan for a heavy civil project D. Identify the main components of highways and bridges E. Interpret the information and dimensions of a heavy civil project from a profile view
XVI.	Evaluations

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Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Suzanne Miller

Course: CONM 116 Construction Graphics

Credits: 2 Hours

Contacts: 1 Lecture Hour and 2 Lab Hours per week

Course Description: A foundation course utilizing basic and complex construction graphics methods used to: communicate; understand ideas and concepts found in construction; and solve graphical representations required to explain the details of building a project. This course familiarizes the student with fundamental principles of construction graphics using hard line, freehand sketching, three-dimensional modeling, and basic computer modeling techniques. This course includes the development of orthographic presentations, isometric drawings, freehand drawings, dimension clarity, and three-dimensional models.

Course Prerequisites: MATH 110 with grade of C- or better OR math ACT 19+/SAT 500+

Required Textbooks: **CONM 116 Coursepack** by Suzanne K. Miller, R.A., LEED AP (BD+C)

Required Materials:
Instructor prepared course handouts
Architectural scale
Engineering scale
30-60-90 triangle (10”)
45 Triangle (10”)
1 eraser (such as a Pink Pearl)
Drafting/mechanical pencils
Pad of graph paper
Drafting dots or drafting tape to hold down drawings
X-Acto Knife
Glue

Course Learning Outcomes

1. Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in two dimensions. (ACCE SLO#1)
2. Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in three dimensions. (ACCE SLO#1)

Assessment Methods:
ACCE SLO #1 Create written communication appropriate to the construction discipline

Project: Create representations of a structure with the appropriate nomenclature and dimensions in two dimensions and three dimensions

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and procedures		1	
2.	Lettering	1	1	1
3.	Scales		1	2
4.	Dimensioning	1,2	1	2
5.	Views - plans and elevations	1,2	1	4
6.	Orthographic projections	1,2	1	2
7.	Sections	1	1	2
8.	Isometric projections	1,2	2	5
9.	3-D Modeling	2	1	3
10.	Topographic modeling	2	1	2
11.	Freehand sketching	1	1	2
12.	Computer modeling	2	1	4
13.	Evaluation		2	
	Total Hours		15	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
I.	Introduction and Procedures A. Discuss the course objectives	

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Course Outline

No.	Topic	CLO(s)
	B. Explain the assignment procedures	
2.	Lettering A. Demonstrate legible printing techniques	
3.	Scales A. Differentiate between architectural and engineering scales and applications B. Correctly read scales C. Correctly determine lengths of lines using different scales	
4.	Dimensioning A. Establish proper dimension lines using graphic principles B. Dimension two and three-dimensional drawings	
5.	Plans and Elevations A. Create plan-view and elevation drawings of three-dimensional objects B. Create drawings with hidden lines representing edges that cannot be seen C. Demonstrate the difference between plan-views and elevations	
6.	Orthographic Projections A. Create a set of drawings (plan-views and elevations) to accurately describe a three-dimensional object in two-dimensions	
7.	Sections A. Develop two-dimensional drawings of sections from a plan-view and an elevation	
8.	Isometric Projections A. Create isometric projections of objects given orthographic drawings	
9.	3-D Modeling A. Create physical three-dimensional models B. Create three-dimensional models using a software program	
10.	Topographic Modeling A. Create topographic drawings from point elevations B. Create a topographic model of a site from contour drawings	
11.	Freehand Sketching A. Demonstrate the ability to use freehand sketching methods to layout and organize project details B. Prepare written and oral instructions to communicate a detail C. Exhibit accurate sketch techniques to develop two and three dimensional drawings	
12.	Computer Modeling Create three-dimensional models with a 3-D computer software tool set	

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Course Outline

Last Revision Date:	September 17, 2015
Program Coordinator:	Suzanne Miller
Drafted By:	Suzanne Miller

Course: CONM 117 Introduction to Building Information Technology for the Construction Industry

Credits: 3 Hours

Contacts: 2 Lecture Hours and 2 Lab Hours per week

Course Description: This course will review basic micro application software including windows type operating systems, word processing, spreadsheets, and presentation software and will introduce the basic principles of Building Information Technology. Students will examine geometry, spatial relationships, geographic information, quantities and properties of building components.

Course Prerequisites: CONM 116; C- in MATH 115/116 or higher or math ACT 24+/SAT 580+

Course Co-requisites: CONM 112

Required Textbooks: Textbook course software– updated as software is updated

Required Materials: Plans for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Demonstrate word processing, spreadsheet, and presentation software proficiency on a variety of assignments typical in the construction industry. (ACCE SLO #1)
2. Explain how Building Information Technology (BIT) is used in the industry and the processes that make up BIT as they apply to information in a company that uses BIT techniques (ACCE SLO #10)
3. Create and modify basic multi-dimensional Building Information Technology models with Civil, Architecture, and Structure (ACCE SLO #10)

Assessment Methods:

ACCE SLO #1 Create written communication appropriate to the construction discipline.
Assignment: Create representations of a structure using the appropriate software

ACCE SLO #10 Apply electronic-based technology to manage the construction process.
Project: Generate a computerized 3D model of a building structure and site

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Word Processing	1	2	2
2.	Spreadsheets	1	2	2
3.	Presentation software	1	1	1
4.	Introduction to Building Information Technology (BIT) and multi-dimensional modeling	2	2	2
5.	Developing and Documenting BIT – Elements and General Architecture	3	14	14
6.	Developing and documenting BIT - Civil	3	4	4
7.	Developing and documenting BIT – Structural Systems	3	4	4
8.	Evaluation		1	1
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Word Processing A. Views B. Manipulate files C. Edit and format D. Modify page layout	1
2.	Spreadsheets A. Data entry B. Worksheet modification C. Formatting D. Formulas and functions E. Sort data	1
3.	Presentation software A. Create a new presentation B. Manipulate slides, tables, graphics C. Animate slides	1
4.	Introduction to Building Information Technology and multi-dimensional modeling A. Define BIT terminology B. Industry use of BIT;it's current level of development C. Future	2
5.	Develop and document using BIT – Elements and General Architecture A. User interface B. Templates; titleblocks; object styles; material and fill patterns C. Work with views, sections, elevations D. Create building components: foundations; floors; walls roofs; stairs; conveying systems, ceilings E. Create families: doors; windows F. Create schedules: rooms; windows; doors; G. Complete a sheet with necessary BIT information	3
6.	Develop and document using BIT – Civil A. User interface B. Templates, object styles, material, and fill patterns C. Site components D. Integration	3
7.	Develop and document using BIT – Structural Systems A. User interface B. Structural system components – frames, columns, walls, roofs, foundations C. Integration	3

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Course Outline

Minimum Required Student Laboratory Activities

No.	Topic	CLO(s)
1.	Word Processing A. Work in different views B. Manipulate files C. Enter, edit, and format text D. Modify page layout	1
2.	Spreadsheets A. Enter data into spreadsheets B. Modify worksheets C. Format cells D. Create formulas and functions E. Sort data	1
3.	Presentation software A. Create a new presentation B. Enter and manipulate slides, tables, graphics C. Animate slides	1
4.	Introduction to Building Information Technology and multi-dimensional modeling A. Define BIT terminology B. Explain industry's use of BIT today; it's current level of development C. BIT in the future	2
5.	Develop and document using BIT – Elements and Architecture A. Explore the user interface B. Prepare templates; titleblocks; object styles; material and fill patterns C. Work with views, sections, elevations D. Create building components: foundations; floors; walls roofs; stairs; conveying systems E. Create families: doors; windows; railings; balusters; posts F. Create schedules: rooms; windows; doors; G. Complete a sheet with necessary BIT information	3
6.	Develop and document using BIT – Civil A. Explore the user interface B. Prepare templates, object styles, material, and fill patterns C. Create site components D. Integrate civil with the architectural system	3
7.	Develop and document using BIT – Structural Systems A. Explore the user interface B. Create structural system components – frames, columns, walls, roofs, foundation stairs, details C. Integrate structural system with architectural system	3

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted by:	Suzanne Miler

Course: CONM 121 Materials Properties and Testing

Credits: 3 Hours

Contacts: 2 Lecture Hours per Week, 2 Lab Hours per Week

Course Description: Application and properties of construction materials. The sampling, testing and application of the physical properties of aggregates and Portland cement concrete; bituminous materials, metals, and wood.

Course Prerequisites: Grade of C- or better in MATH 115 or math ACT 24+ or SAT 580+

Required Textbooks: *Basic Construction Materials* by Marotta

Required Materials: None

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

1. Demonstrate an understanding of material properties through industry-standard testing procedures (ACCE SLO #8).
2. Create formal written laboratory reports (ACCE SLO #1).

Assessment Methods:

ACCE SLO #1 Create written communication appropriate to the construction discipline.
Assignment Generate lab reports for appropriate tests conducted during labs.

ACCE SLO #8 Analyze methods, materials, and equipment used to construct projects.
Test - internal: Solve problems based on construction material properties

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS	LAB HOURS
1	Introduction		1	0
2	Material properties, units of measure and conversion of units	1	1	0
3	Laboratory techniques and standard testing procedures	2	1	2
4	Origins, properties, uses and specifications of aggregates	1	5	0
5	Aggregate sampling and gradation analysis	2	0	4
6	Aggregate weight-volume and moisture relationships.	1	1	4
7	Aggregate quality and testing	2	1	2
8	History, types and uses of Portland cement	1	2	0
9	Properties, uses, mixing, placing and curing of Portland cement concrete	2	3	2
10	Design, mixing and testing of Portland cement concrete mixes	2	0	10
11	Properties, uses, specifications, mix design methods and placement of asphalt cement mixes	1	3	0
12	Properties, uses and specifications of masonry and mortar.	1	3	4
13	Properties, uses and specifications of steel and other metals	1	3	2
14	Properties, uses and specifications of wood and wood products.	1	3	0
15	Examinations		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1	Introduction A. Describe course syllabus requirements. B. Describe course grading, attendance and conduct policies.
2	Materials properties, units of measure. A. Describe measurable properties of materials. B. List various units of measure. C. Demonstrate conversion of English and metric units.
3	Laboratory techniques and standard testing procedures. A. Demonstrate proper use of laboratory equipment. B. Describe standard testing procedures.
4	Origins, properties, uses and specification of aggregates. A. Describe the types and uses of aggregates. B. Identify the origins of aggregates. C. Identify various aggregate properties. D. Use standard aggregate specifications. E. Identify sources of aggregate.
5	Aggregate sampling and gradation analysis. A. Demonstrate sampling and splitting techniques. B. Perform a standard washed sieve analysis. C. Perform calculations and graph sieve analysis data. D. Calculate related quantities, including uniformity coefficient and fineness modulus.
6	Aggregate weight-volume and moisture relationships. A. Describe and calculate aggregate bulk and apparent specific gravity. B. Calculate moisture content and percent absorption. C. Calculate coarse aggregate wet and dry unit weights. D. Calculate volumetric relationship between solids and voids.
7	Aggregate quality and testing A. Demonstrate Los Angeles abrasion test for coarse aggregate. B. Perform graphical aggregate blending exercise. C. Demonstrate test for deleterious materials.
8	History, types and uses of Portland cement A. Explain the history of cemented aggregate mixes. B. Describe the production of Portland cement. C. Describe the properties and uses of various types of cement.
9	Properties, uses, mixing, placing and curing of Portland cement concrete. A. Recognize terminology and methods related to concrete.

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Course Outline

	B. Describe preparation of steel and formwork and proper placement and consolidation. C. Identify weather-related issues related to placement in various weather conditions.. D. Describe proper curing methods for concrete. E. Identify construction-related techniques.
10	Design, mixing and testing of Portland cement concrete mixes. A. Perform a mix design using ACI methods. B. Mix and place concrete beams and cylinders. C. Perform slump and air content tests on fresh concrete. D. Perform destructive tests on cylinders and beams.
11	Properties, uses, specifications, mix design methods and placement of asphalt cement mixes. A. Definition types and sources of asphalt cement. B. Explain liquefied asphalts, including cutbacks and emulsions. C. Describe the properties and uses of Hot Mix Asphalt mixes. D. Describe methods for the design of HMA. E. Explain production, mixing and placement of HMA. F. Describe types of production plants.
12	Properties, uses and specification of masonry and mortar. A. Describe types of masonry and units. B. List standard masonry sizes and quantity determinations. C. Explain types and uses of masonry cements. D. Identify specifications for masonry units and cements.
13	Properties, uses and specifications of steel and other metals. A. Draw and interpret a steel stress-strain diagram. B. Examine and calculate related steel properties, such as Modulus of Elasticity. C. Describe types of steel used in construction. D. Evaluate the types and strengths of bolted connections.
14	Properties, uses and specification of wood and wood products. A. Discuss construction industry terminology. B. List lumber grading standards. C. Discuss wood products such as plywood and gluelam beams. D. Discuss methods of wood preservation. E. Strength of lumber under load.
15	Examinations

Minimum Required Student Laboratory Activities

1	Technical report writing A. Submit formal written laboratory reports.
2	Standard test procedures A. Identify standard industry testing procedures utilized in each laboratory exercise.
3	Aggregate sampling and testing A. Obtain representative samples utilizing industry standards. B. Perform standard washed sieve analysis. C. Perform aggregate unit weight tests. D. Perform specific gravity and moisture content tests on coarse and fine aggregates.
4	Perform a Portland cement concrete mix design: A. Follow ACI recommendations B. Calculate for adjustment of moisture C. Calculate batch quantities.
5	Mix Portland cement concrete. A. Perform slump and air content tests. B. Pour and finish cylinders and beams.
6	Test concrete specimens. A. Perform compressive and flexural tests on concrete beams and cylinders.
7	Create and test masonry specimens. A. Prepare mortar mixes. B. Test fresh mortar mixes for consistency. C. Perform compression tests on mortar cubes.
8	Determine properties of steel. A. Calculate stress and strain from data supplied by instructor. B. Draw and stress-strain graph. C. Determine mathematical properties from the graph.

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted by:	Suzanne Miler

Course: CONM 121 Materials Properties and Testing

Credits: 3 Hours

Contacts: 2 Lecture Hours per Week, 2 Lab Hours per Week

Course Description: Application and properties of construction materials. The sampling, testing and application of the physical properties of aggregates and Portland cement concrete; bituminous materials, metals, and wood.

Course Prerequisites: Grade of C- or better in MATH 115 or math ACT 24+ or SAT 580+

Required Textbooks: *Basic Construction Materials* by Marotta

Required Materials: None

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

1. Demonstrate an understanding of material properties through industry-standard testing procedures (ACCE SLO #8).

2. Create formal written laboratory reports (ACCE SLO #1).

Assessment Methods:

ACCE SLO #1 Create written communication appropriate to the construction discipline.
Assignment Generate lab reports for appropriate tests conducted during labs.

ACCE SLO #8 Analyze methods, materials, and equipment used to construct projects.
Test - internal: Solve problems based on construction material properties

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS	LAB HOURS
1	Introduction		1	0
2	Material properties, units of measure and conversion of units	1	1	0
3	Laboratory techniques and standard testing procedures	2	1	2
4	Origins, properties, uses and specifications of aggregates	1	5	0
5	Aggregate sampling and gradation analysis	2	0	4
6	Aggregate weight-volume and moisture relationships.	1	1	4
7	Aggregate quality and testing	2	1	2
8	History, types and uses of Portland cement	1	2	0
9	Properties, uses, mixing, placing and curing of Portland cement concrete	2	3	2
10	Design, mixing and testing of Portland cement concrete mixes	2	0	10
11	Properties, uses, specifications, mix design methods and placement of asphalt cement mixes	1	3	0
12	Properties, uses and specifications of masonry and mortar.	1	3	4
13	Properties, uses and specifications of steel and other metals	1	3	2
14	Properties, uses and specifications of wood and wood products.	1	3	0
15	Examinations		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1	Introduction A. Describe course syllabus requirements. B. Describe course grading, attendance and conduct policies.
2	Materials properties, units of measure. A. Describe measurable properties of materials. B. List various units of measure. C. Demonstrate conversion of English and metric units.
3	Laboratory techniques and standard testing procedures. A. Demonstrate proper use of laboratory equipment. B. Describe standard testing procedures.
4	Origins, properties, uses and specification of aggregates. A. Describe the types and uses of aggregates. B. Identify the origins of aggregates. C. Identify various aggregate properties. D. Use standard aggregate specifications. E. Identify sources of aggregate.
5	Aggregate sampling and gradation analysis. A. Demonstrate sampling and splitting techniques. B. Perform a standard washed sieve analysis. C. Perform calculations and graph sieve analysis data. D. Calculate related quantities, including uniformity coefficient and fineness modulus.
6	Aggregate weight-volume and moisture relationships. A. Describe and calculate aggregate bulk and apparent specific gravity. B. Calculate moisture content and percent absorption. C. Calculate coarse aggregate wet and dry unit weights. D. Calculate volumetric relationship between solids and voids.
7	Aggregate quality and testing A. Demonstrate Los Angeles abrasion test for coarse aggregate. B. Perform graphical aggregate blending exercise. C. Demonstrate test for deleterious materials.
8	History, types and uses of Portland cement A. Explain the history of cemented aggregate mixes. B. Describe the production of Portland cement. C. Describe the properties and uses of various types of cement.
9	Properties, uses, mixing, placing and curing of Portland cement concrete. A. Recognize terminology and methods related to concrete. B. Describe preparation of steel and formwork and proper placement and consolidation. C. Identify weather-related issues related to placement in various weather conditions.. D. Describe proper curing methods for concrete.

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Course Outline

	E. Identify construction-related techniques.
10	Design, mixing and testing of Portland cement concrete mixes. A. Perform a mix design using ACI methods. B. Mix and place concrete beams and cylinders. C. Perform slump and air content tests on fresh concrete. D. Perform destructive tests on cylinders and beams.
11	Properties, uses, specifications, mix design methods and placement of asphalt cement mixes. A. Definition types and sources of asphalt cement. B. Explain liquefied asphalts, including cutbacks and emulsions. C. Describe the properties and uses of Hot Mix Asphalt mixes. D. Describe methods for the design of HMA. E. Explain production, mixing and placement of HMA. F. Describe types of production plants.
12	Properties, uses and specification of masonry and mortar. A. Describe types of masonry and units. B. List standard masonry sizes and quantity determinations. C. Explain types and uses of masonry cements. D. Identify specifications for masonry units and cements.
13	Properties, uses and specifications of steel and other metals. A. Draw and interpret a steel stress-strain diagram. B. Examine and calculate related steel properties, such as Modulus of Elasticity. C. Describe types of steel used in construction. D. Evaluate the types and strengths of bolted connections.
14	Properties, uses and specification of wood and wood products. A. Discuss construction industry terminology. B. List lumber grading standards. C. Discuss wood products such as plywood and gluelam beams. D. Discuss methods of wood preservation. E. Strength of lumber under load.
15	Examinations

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Course Outline

Minimum Required Student Laboratory Activities

1	Technical report writing A. Submit formal written laboratory reports.
2	Standard test procedures A. Identify standard industry testing procedures utilized in each laboratory exercise.
3	Aggregate sampling and testing A. Obtain representative samples utilizing industry standards. B. Perform standard washed sieve analysis. C. Perform aggregate unit weight tests. D. Perform specific gravity and moisture content tests on coarse and fine aggregates.
4	Perform a Portland cement concrete mix design: A. Follow ACI recommendations B. Calculate for adjustment of moisture C. Calculate batch quantities.
5	Mix Portland cement concrete. A. Perform slump and air content tests. B. Pour and finish cylinders and beams.
6	Test concrete specimens. A. Perform compressive and flexural tests on concrete beams and cylinders.
7	Create and test masonry specimens. A. Prepare mortar mixes. B. Test fresh mortar mixes for consistency. C. Perform compression tests on mortar cubes.
8	Determine properties of steel. A. Calculate stress and strain from data supplied by instructor. B. Draw and stress-strain graph. C. Determine mathematical properties from the graph.

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Course Outline

Last Revision Date	October 2016
Program Coordinator	Suzanne Miller
Drafted By	Dan Pratt

Course: CONM 122 Construction Surveying & Layout

Credits: 3 Hours

Contacts: 2 hours of lecture, 3 hours of lab, per week.

Course Description: Fundamentals of construction surveying, including distance measurement, leveling, angular measurement, traversing, topographic surveying, volume calculations, circular curves, building and roadway layout and grading.

Course Prerequisites: C- in MATH 120 or 126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Construction Surveying, Crawford, Third Edition

CONM 122 – Course-pack, available in bookstore.

Equipment and Supplies: A Calculator with Trig Functions is required for tests, assignments and field work.

Course Learning Outcomes

Upon the completion of this course, the learner will be able to:

1. Accurately measure and record surveying field data (ACCE SLO #11)
2. Accurately calculate and lay out construction surveying field data (ACCE SLO #11)

Assessment Methods:

ACCE SLO #11 Apply basic surveying techniques for construction layout and control.
Written Product: Lab reports, calculations, and field notes for several surveying exercises.

Instructional Unit Topic Descriptions and Time Allocations

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Course Outline

Unit No.	Unit Topic Description	Lecture	Lab	CLO
1	Introduction and procedures	1	3	
2	Differential leveling	2	3	1
3	Profile and cross-section leveling	2	3	1
4	Contours	2	1	
5	Distance measuring	2	3	1
6	Horizontal angles and vertical angles	2	3	1
7	Traversing	2	6	1
8	Coordinate Calculations	2	3	2
9	Azimuth and Bearing Calculations	2	6	2
10	Building foundation layout	2	6	2
11	Roadway layout	2	6	2
12	Mapping, Plotting, Sketching	1		
13	Earthwork calculations	2	2	
14	Horizontal Curves and Vertical Curves	2		
	Assessments	4		
	Total time	30	45	

*Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Learning Outcomes for Each Instructional Unit

Unit No.	Topic
1	Introduction and procedures Discuss course objectives Explain assignment procedures
2	Differential Leveling Identify equipment used for differential leveling Record rod readings in field notes Compute elevations from rod readings and known elevations Compute closure accuracy of bench mark loop
3	Profile and cross-section leveling Plot stationing and grids on a scaled drawing Record stations and elevations Compute elevations and contours
4	Contours Read contours from maps and construction drawings

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	Plot contours on a scaled drawing Plot scaled profiles of ground elevations from contours
5	Distance measuring measure and record horizontal distances measure and record slope distances
6	Horizontal angles and vertical angles identify instruments used for measuring horizontal and vertical angles Measure and record horizontal angles Measure and record vertical angles
7	Traversing Measure and record traverse angles Compute summation of traverse angles Adjust traverse angles Compute traverse closure
8	Coordinate Calculations Recognize how the Cartesian coordinate system is used in surveying Compute polar coordinates from rectangular coordinates Compute rectangular coordinates from polar coordinates
9	Azimuth and Bearing Calculations Compute azimuths and bearings from field angles Compute azimuths from bearings Compute bearings from azimuths
10	Building foundation layout Compute building foundation layout with polar and rectangular coordinates Compute elevations for proposed building foundations
11	Roadway layout Compute proposed roadway centerline Compute elevations for proposed roadway centerline
12	Mapping, Plotting, Sketching Plot stations, ground elevations, and contours in plan views Plot stations and ground elevations in profile views Plot existing and proposed facilities in plan and profile views
13	Earthwork calculations Compute earthwork volumes for building excavation Compute earthwork volumes for roadway excavation
14	Horizontal Curves and Vertical Curves Compute horizontal curves Compute vertical curves

Learning Outcomes for Each Laboratory Unit

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Course Outline

Unit No.	
1	Differential Leveling Set up and level an automatic level Read and record rod readings Compute elevations from benchmarks
2	Profile and cross-section leveling Layout stationing and grids Record stations and elevations Compute elevations and contours
3	Distance measuring Measure and record horizontal distances Measure and record slope distances Layout facilities with accurate measurements
4	Horizontal angles and vertical angles Measure and record horizontal angles Measure and record vertical angles
5	Traversing Measure and record traverse angles Compute summation of traverse angles Adjust traverse angles Compute traverse closure
6	Coordinate Calculations Recognize how the Cartesian coordinate system is used in surveying Compute polar coordinates from rectangular coordinates Compute rectangular coordinates from polar coordinates
7	Azimuth and Bearing Calculations Compute azimuths and bearings from field angles Compute azimuths from bearings Compute bearings from azimuths
8	Building foundation layout Compute and layout building foundations with polar and rectangular coordinates Compute and set elevations for proposed building foundations Perform as-built, compare to plan data
9	Roadway layout Compute and layout proposed roadway centerline Compute and set elevations for proposed roadway Perform as-built, compare to plan data

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Course Outline

10	Mapping, Plotting, Sketching Plot stations, ground elevations, and contours in plan views Plot stations and ground elevations in profile views Plot existing and proposed facilities in plan and profile views
11	Horizontal Curves and Vertical Curves Compute and layout horizontal curves Compute and layout vertical curves

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Course Outline

Last Revision Date:	August 22, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Lee Templin

Course: CONM 211 Construction Estimating I

Credits: 3 Hours

Contacts: 2 Lecture, 2 Lab Hours per Week

Course Description: The elements involved in the preparation of the contractor's bid proposal. Quantity takeoff, crew sizes, daily outputs, unit costs and organization of the bid packages into general contracted and subcontracted work.

Course Prerequisites: CONM 116/ARCH 101, CONM 111/ARCH 115, CONM 112/ARCH 102, Grade of C- or better in MATH 120/MATH 126

Required Textbooks: Toenjes, Leonard P.; *Construction Estimating*, 2nd Edition, American Technical Publishers
R.S. Means, (Current Year) *Building Construction Cost Data*. Kingston, MA

Required Materials: Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Obtain estimating data from industry sources (ACCE SLO #4).
2. Perform quantity takeoffs utilizing contract documents. (ACCE SLO #4)
3. Complete a bid proposal. (ACCE SLO #4)
4. Utilize technology to complete bid estimates. (SLO #4, ACCE SLO #10)
5. Discuss ethical issues in bidding. (ACCE SLO #6)

Assessment Methods:

ACCE SLO #4 Create construction project cost estimates.
Written Product: Generate project estimate and corresponding bid proposal form

ACCE SLO #6 Analyze professional decisions based on ethical principles.
Assignment: Identify unethical bidding scenarios

ACCE SLO #10 Apply electronic-based technology to manage the construction process.
Assignment: Create a construction estimate using computer software.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations*

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction		1	0
2.	Bid Package Documents	1	2	2
3.	Means Book, Productivity	1	2	2
4.	Electronic Estimating	4	2	4
5.	Excavation	2	2	2
6.	Concrete	2	2	4
7.	Masonry	2	2	2
8.	Structural Steel	2	2	2
9.	Carpentry	2	2	2
10.	Overhead	3	2	2
11.	Bonds and Insurance	3	2	0
12.	Specialty Trades and Subcontractor Bid Analysis	3	2	4
13.	Bid Submittal Procedures, Forms, and Bid Opening	3	2	2
14.	Bidding Ethics	5	2	2
15.	Evaluation		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic
1.	Introduction and orientation. A. Discuss the course organization and course goals. B. Identify the supporting references, including software tools. C. State the instructor's expectations, attendance and grading policies.
2.	Bid Package Documents A. Describe the purpose of each bidding document. B. Use the bid package documents to develop bid estimate items.
3.	Means Book, Productivity A. Find the proper Construction Specifications Institute Number(s) for specific activities and state the daily output, unit prices, and crew size from the Means book. B. Calculate the productivity rate, the total work hours, the number of days, the contractor's crew costs per day, the contractor's labor unit cost, the contractor's equipment unit cost and the total costs for materials for specific activities using the Means Cost Data Book.
4.	Electronic Estimating A. Input quantities for work package items. B. Develop a quantity takeoff spreadsheet using spreadsheet software. C. Develop a pricing spreadsheet using spreadsheet software to summarize the prices.
5.	Excavation A. Identify the type of work locations and operations for excavation. B. Compute the building excavation quantities, working space and slope quantities. C. Determine the excavation quantities for a trench.
6.	Concrete A. Identify the type of work locations and operations for concrete. B. Determine the square feet of contact area for concrete work items. C. Calculate the total lineal feet and pounds of rebar for concrete work items. D. Compute the cubic yards of concrete.
7.	Masonry A. Identify the type of work locations and operations for masonry. B. Identify the various masonry patterns and calculate the number of bricks per square foot.
8.	Structural Steel A. Identify the type of work locations and operations for structural steel. B. Calculate the structural steel quantities. C. Determine the structural steel cost using various methods.

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Course Outline

9.	Carpentry A. Identify the type of work locations and operations for carpentry. B. Determine the number of studs and the total lineal feet of various components. C. Calculate the total amount of square feet of sheathing for various items.
10.	Overhead A. Describe overhead items. B. Describe the methods for calculating overhead.
11.	Bonds and Insurance A. Define the types of bonds and insurance. B. Calculate the premium cost.
12.	Specialty Trades and Subcontractor Bid Analysis A. Describe the components of the specialty trade subcontractor bids. B. Evaluate differing subcontractor bids to determine best package
13.	Bid Submittal Forms and Bid Opening A. Complete the bid submittal forms B. Complete the bid package documents. C. Submit bid proposal during a mock bid opening.
14.	Bidding Ethics A. Define bidding ethics. B. Select the proper ethical solution given certain situations.
15.	Examinations

Minimum Required Student Laboratory Activities

2.	Bid Package Documents A. Search the bid package documents.
3.	Means book, productivity A. Calculate total costs for work hours, productivity rate, and duration for specific activities using the Means Cost Data book.
4.	Electronic Estimating A. Create an estimating spreadsheet for a portion of work. B. Utilize an estimating program to prepare a construction estimate.
5.	Excavation A. Calculate excavation quantities utilizing various methods.
6.	Concrete A. Calculate formwork, reinforcement and concrete quantities using the construction plans.

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Course Outline

7.	Masonry A. Calculate the masonry quantities using the construction plans.
8.	Structural Steel A. Calculate structural steel quantities using the construction plans.
9.	Carpentry A. Calculate carpentry quantities using a set of construction plans.
10.	Overhead A. Calculate the project overhead and the percentage overhead. B. Determine the amount of the bond premium.
11.	Specialty Trades and Subcontractor Bid Analysis A. Perform quantity takeoff for specialty trade work items. B. Evaluate different subcontractor quotations and corresponding scope of works to determine the best package.
13.	Bid Submittal Forms and Bid Opening A. Complete the bid submittal forms. B. Participate in a mock bid opening.
14.	Bidding Ethics A. Discuss ethical conduct during the estimating process.

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Course Outline

Last Revision Date:	December, 2015
Program Coordinator:	Suzanne Miller
Drafted by:	Bob Eastley

Course: CONM 212 Soils and Foundations

Credits: 3 Hours

Contacts: 2 Lecture Hours per Week, 2 Lab Hours per Week

Course Description: Introduction to soil mechanics. The origin and engineering characteristics of soil, soil classification systems, the strength of soil masses, control of structural embankments and an introduction to the design of foundations.

Course Prerequisites: CONM 121/ARCH 112, Grade of C- or better in Math 120/Math 126

Required Textbooks: Liu and Evett (2004). *Soils and Foundations*. Sixth Edition. Upper Saddle River, New Jersey: Pearson: Prentice Hall.

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate:

1. Recognize the interaction between water and soil.
2. Calculate soil bearing capacity (ACCE SLO #8).
3. Identify the elements of soil compaction.
4. Identify soil characteristics using field and laboratory techniques.
5. Understand principles of foundation design and analysis (ACCE SLO #19).

Assessment Methods:

ACCE SLO #8 Analyze methods, materials, and equipment used to construct a project.
Assignment and Test-internal: Calculate sol bearing capacity.

ACCE SLO #19 Understand the basic principles of structural behavior.
Assignment and Test-internal: Determine required foundation sizes given certain soil parameters and characteristics.

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS	LAB HOURS
1	Introduction		1	0
2	The origin and glacial history of soil and soil deposits		2	0
3	Site investigation and the visual identification of soils	4	2	2
4	The laboratory classification of soils	4	0	6
5	Weight-volume relationships of soil, water and air in soil masses	3	2	6
6	Water in soil	1	2	2
7	The construction and control of structural embankments, including proper use of construction equipment	4	3	6
8	The development of stress in soil masses	1	3	0
9	The strength of soil masses	2	3	4
10	Foundation types and application	2	1	0
11	Spread foundation design	2,5	4	2
12	Pile foundation design and installation	2,5	4	2
13	Examinations		3	0
	Total		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1	Introduction A. Identify the course syllabus objectives B. Describe the laboratory report format C. Conduct laboratory testing procedures
2	The origin and glacial history of soils and soil deposits A. Define soil deposit terms B. Describe the types of parent rock C. Describe the types of soil D. Identify the glacial history of Michigan
3	Site investigation and the visual identification of soils A. Identify topographical features B. Conduct a field classification of a soil sample C. Identify a collection of soil samples for laboratory classification D. Review the soil boring and soil investigation reports for specific information
4	The laboratory classification of soils A. Classify a soil sample using the Unified Classification System B. Classify a soil sample using the AASHTO Soil Classification System
5	Weight-volume relationships of soils A. Understand the weight-volume relationships of soils B. Perform weight-volume calculations
6	Water in soil A. Describe the capillary action of water B. Identify the properties of submerged soils C. Discuss drainage and percolation of soils D. Explain the frost action of soils
7	The construction and control of structural embankments, including proper use of construction equipment A. Find construction methods of structural embankments B. Describe the most efficient compaction equipment for various types of soil C. Identify various methods to control compaction in the field D. Calculate maximum dry density and optimum moisture content E. Calculate the various volumes of soil in their different states F. Calculate the swell and shrinkage percentages and the swell and shrinkage factors G. Identify the safety slopes and shoring systems for various types of soil
8	The development of stress in soils masses A. Calculate the vertical stresses due to soil mass and sue to applied loads B. Calculate the horizontal stresses on soil
9	The strength of soil masses A. Describe the properties of cohesive soils

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	B. Explain the properties of cohesionless soils C. Identify the properties of combined soils
10	Foundation types and applications A. Describe the principles of shallow foundations B. Identify the principles of deep foundations
11	Spread foundation design A. Identify the building code requirements B. Determine the bearing capacity equations C. Describe the spread foundation design principles
12	Pile foundation design and installation A. Describe the principles of pile design B. Identify the pile driving equipment C. Calculate the force necessary to drive piles using the pile driving formulas
13	Examinations

Minimum Required Student Laboratory Activities

1	Report writing A. Submit written report for laboratory exercises
2	Soil classification A. Perform field identification and a laboratory classification of selected soils
3	Compaction control A. Determine maximum dry density and optimum moisture content of soils
4	Field density control A. Investigate field density control methods B. Use of the nuclear density meter and nuclear safety are included
5	Soil strength A. Investigate soil strength using the unconfined compression test and the direct shear test
6	Excavation A. Study techniques for computing excavation quantities and applying soil shrinkage and swell factors
7	Foundation A. Apply previously studied principles to the solution of foundation design problems

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted by:	Bob Eastley

Course: CONM 221 STATICS AND STRUCTURES

Credits: 3 Credit Hours

Contacts: 3 Lecture Hours per Week

Course Description: Statics and strength of materials as they relate to the design and construction of structural components, including stress-strain, tension and compression, elasticity, shear, bending, and deflection of beams, centroids, moments of inertia, welded and bolted connections, friction, thermal expansion, and truss analysis.

Course Prerequisites: C- in MATH 120 or 126 OR higher OR math ACT 26+/SAT 610+; PHYS 211

Required Textbooks: Applied Statics, Strength of Materials, and Building Structure Design, Wujek

Required Materials:

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

(1) Understand equilibrium, free-body diagrams and vector analysis.
(2) Apply the concepts of equilibrium and free body diagrams to the analysis and design of basic structural elements.
(3) Apply structural analysis and design using wood and metals (ACCE SLO #19).

Assessment Methods:

ACCE SLO #19 Understand the basic principles of structural behavior.
Assignment and Test-Internal -Apply structural analysis and design methods for different construction materials.

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS
1	Introduction		1
2	Force systems	1	5
3	Beam loads	2	4
4	Shear and moment in beams	2	5
5	Centroids	2	3
6	Moment of inertia	2	3
7	Beam shear stress, bending stress, deflection design	3	5
8	Stress-strain, modulus of elasticity, thermal stress and expansion.		4
9	Column Analysis using AISC and Euler principles	3	4
10	Truss analysis	2	6
11	Open-web joists	3	2
12	Examinations		3
	Total		45

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1	Introduction A. Describe course requirements. B. List grading and attendance policies.
2	Force systems. A. Identify types of forces. B. Recognize components of forces. C. Determine resultants of forces. D. Develop equations of static equilibrium. E. Calculate moments and couples. F. Utilize sign conventions. G. Construct free body diagrams. H. Calculate support reactions.
3	Beam loads. A. Identify point (concentrated) loads. B. Calculate resultants of uniformly and non-uniformly distributed loads. C. Identify building code loads. D. Differentiate between dead and live loads.
4	Shear and moment in beams. A. Calculate using free body diagrams. B. Draw shear and moment diagrams.
5	Centroids. A. Compute center of gravity and geometric centroid. B. Determine centroids of composite areas.
6	Moment of inertia. A. Calculate moment of inertia by approximate method. B. Utilize the transfer formula. C. Determine moment of inertia of composite areas.
7	Shear stress, bending stress, deflection, design. A. Define shear and bending stress. B. Calculate section modulus. C. Identify allowable stresses from stress-strain diagram D. Calculate beam deflections. E. Perform beam design (selection) from allowable stresses and deflection.
8	Stress-strain, modulus of elasticity, thermal expansion. A. Define tension and compression. B. Calculate stress and strain. Define and determine modulus of elasticity. C. Calculate deformation under axial load. D. Calculate thermal expansion and stresses.

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Course Outline

9	Analysis of columns, AISC and Euler equations. A. Define and compute radius of gyration. B. Calculate slenderness ratio. C. Utilize effective length. D. Calculate loads and stresses using AISC and Euler column formulas.
10	Truss analysis. A. Define two-force members. B. Calculate member forces using method of joints. C. Calculate member forces using method of sections.
11	Open-web steel joists. A. Describe types of joists. B. Determine distributed loads from live and dead loads. C. Calculate equivalent uniform loads from concentrated loads. D. Select joists from tables.
12	Examinations

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Course Outline

Last Revision Date:	August 22, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Lee Templin

Course: CONM 222 Construction Administration

Credits: 3 Hours

Contacts: 2 Lecture and 2 Lab Hours per Week

Course Description: Study of the project documentation and on-site administration procedures for construction projects. Use of construction documents and project planning methods. Knowledge of the structure of the construction industry and project delivery systems. Emphasis on project administration procedures for time, cost, and quality control during the construction process. Prepare documentation for changes in construction process.

Course Prerequisites: CONM 111 , CONM 112, CONM 211, Grade of C- or better in MATH 120/126

Required Textbooks: Construction Project Administration, 10th Ed., Fisk and Reynolds

Required Materials: Plans and Specifications for the Program's designated project (which are updated periodically)
Calculator with exponential functions

Course Learning Outcomes

1. Understand construction delivery systems. (ACCE SLO #12)
2. Understand basic elements of construction scheduling. (ACCE SLO #5)
3. Create basic construction documentation. (ACCE SLO #7)
4. Understand the requirements of delivering a construction project based on time, cost and quality. (ACCE SLO #14 and #15)
5. Understand the nature of changes to the construction process.

Assessment Methods:

ACCE SLO #12 Understand Different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
Assignment- Designate responsibilities of project tasks according to project type.

ACCE SLO #5 Create construction project schedules.
Assignment- Develop a schedule using a network diagram.

ACCE SLO #7 Analyze construction documents for planning and management of construction processes.
Assignment -

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Course Outline

ACCE SLO #14 Understand construction accounting and cost control.
Assignment- create a field order and determine its impact upon the project budget.

ACCE SLO #15 Understand construction quality assurance and control.
Assignment - create a project submittal.

Instructional Unit Topic Descriptions and Time Allocations*

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction		1	0
2.	Construction Resources and Organization	1	1	2
3.	Construction Meetings	4	2	2
4.	Construction Documents	5	2	2
5.	Documents, Shop Drawings, Reference Standards	3, 4	2	4
6.	Contract Documents	4, 5	2	2
7.	Project Planning Activities and Logic Diagramming	2	2	0
8.	Construction Scheduling	2	2	4
9.	Subcontract Bid, Agreement and Trade Instructions	4, 5	2	1
10.	Procurement Procedures	4	2	1
11.	Field Documentation and Recordkeeping	3	2	4
12.	Daily Preplanning	2	2	2
13.	Productivity and Cost Reports	3	3	4
14.	Cost Coding and Payment Procedures	3, 4	2	2
15.	Evaluation		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic
1.	Introduction A. Discuss the course objectives. B. Explain the assignment procedures.
2.	Construction Resources and Organization A. Draw an organizational chart of different project delivery systems. B. Describe the duties and responsibilities of the contractual parties. C. Define the various crafts.
3.	Construction Meetings A. Identify the purpose and outcome of various construction meetings. B. Prepare meeting minutes from a public or private meeting.
4.	Construction Documents A. Describe the purpose of each document. B. Search the documents for specific requirements.
5.	Documents, Shop Drawings, Reference Standards A. Search project specifications for submittal requirements. B. Find the reference standards, incorporated by reference. C. Prepare submittals and shop drawings according to specifications.
6.	Contract Documents A. Describe stop work orders, notices and schedule of values. B. Compare the change order, change directive, and extra work. C. Prepare a complete change order proposal. D. Describe the documents that limit the cost of a change order.
7.	Project Planning Activities and Logic Diagramming A. Define the planning logic terminology. B. List the design and procurement sequences. C. Draw a bar chart schedule for a project. D. Develop a logic network for a project.
8.	Construction Scheduling A. Define the scheduling terms. B. Calculate the activity duration for various activities. C. Determine the start and finish dates for a project.

9.	Subcontract Bid, Agreement and Trade Instructions A. Develop a scope of work for a given project
10.	Procurement Procedures A. Describe the procurement procedures. B. Describe the shipping and accounting terms. C. Complete a purchase order.
11.	Field Documentation and Record Keeping A. Identify the content of daily construction report. B. Identify the content of the job dairy and the legal rules. C. Complete the time card. D. Cite the proper CSI numbers.
12.	Daily Preplanning A. Identify the content areas of the preplan. B. Complete all components of a preplan. C. Describe the components for each major content area.
13.	Cost Coding and Payment Procedures A. Describe the Work Breakdown Structure (WBS). B. Cost code the work descriptions. C. Record the cost transactions into the ledger. D. Understand the payment application process. E. Understand the elements of the Michigan Construction Lien Act.
14.	Productivity and Cost Reports A. Describe how to ensure accuracy of the reports. B. Prepare the earned work hour report and the labor cost report. C. Prepare the project cost summary report.
15.	Evaluation

Minimum Required Student Laboratory Activities

2.	Construction Resources and Organization A. Utilize the available resources to describe managerial and craft positions.
3.	Construction Meetings A. Conduct a mock construction meeting. B. Prepare meeting minutes from the meeting.
4.	Construction Documents A. Review and search the documents for specific requirements.
5.	Documents, Shop Drawings, Reference Standards A. Review and search project specifications for submittal requirements. B. Develop submittal items and submittal packages utilizing project management application. C. Research the internet for product data to be submitted for the current project.

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Course Outline

6.	Contract Documents A. Research the contract documents to prepare a change order proposal. B. Prepare a complete change order proposal utilizing project management application.
8.	Construction Scheduling A. Develop a construction schedule for given project data. B. Produce basic construction schedule reports.
9.	Subcontract Bid, Agreement and Trade Instructions A. Complete the subcontract agreement utilizing project management application.
10.	Procurement Procedures A. Complete a purchase order utilizing project management application.
11.	Field Documentation and Record Keeping A. Create daily construction report utilizing project management application.
12.	Daily Preplanning A. Create the daily preplan. B. Complete a crane operations plan.
13.	Cost Coding and Payment Procedures A. Develop the cost codes for a project given the certain data. B. Prepare a payment application for a project given the certain data. C. Describe the elements and process of liens under the Michigan Construction Lien Act.
14.	Productivity and Cost Reports A. Describe how to ensure accuracy of the reports B. Prepare the earned work hour report and the labor cost report C. Prepare the project cost summary report

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Dan Pratt

Course: CONM 225 Field Engineering

Credits: 3 Hours

Contacts: 2 Lecture and 3 Lab Hours per Week

Course Description: Management of the construction site, including planning and layout of temporary and permanent site facilities, field engineering calculations, project documentation, regulatory requirements and sustainable construction practices.

Course Prerequisites: CONM 117, 122; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+

Required Textbooks: Construction Surveying, Crawford, Third Edition

Required Materials: BCTM 225 – Course-pack, available in bookstore Calculator with exponential functions

Course Learning Outcomes

1. Examine site erosion and storm water control (ACCE SLO# 7)
2. Examine codes, ordinances, regulations, and operations documentation (ACCE SLO# 7)
3. Establish and calculate horizontal and vertical control points for construction site layout (ACCE SLO# 11)
4. Calculate and perform construction site layout (ACCE SLO# 11)

Assessment Methods:

ACCE SLO #7: Analyze construction documents for planning and management of construction processes.
Internal test questions.

ACCE SLO #11: Apply basic surveying techniques for construction layout and control.
Written products -lab reports, calculations, and field notes for layout out buildings and roadways.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations*

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and procedures		1	0
2.	Contours, elevations and material volume calculations	1	3	
3.	Azimuths, bearings and coordinate calculations	2	3	
4.	Site storm-water and soil erosion control requirements	5	5	
5.	Field engineering calculations	2 & 3	3	6
6.	Field operations documentation	1	4	6
7.	Building codes and regulations	1 & 4	4	6
8.	Special topics in field engineering		1	
9.	Horizontal and Vertical site control	2		6
10.	Structure layout and grading	3		9
11.	Sustainability in construction	5	3	12
12.	Evaluations		3	
	Total Hours		30	45

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1.	Introduction and procedures • Discuss course objectives • Explain assignment procedures • Discuss the duties and responsibilities of a field engineer
2.	Contours, elevations and material volume calculations • Set bench mark and site elevations • Plot contours from ground elevations • Construct cross section diagrams from contours • Compute earthwork volumes for fills and excavations • Compute earthwork volumes for storm detention areas and other site work
3.	Azimuths, bearings and coordinate calculations • Compute azimuths from bearings and bearings from azimuth • Compute azimuths from the angles of a closed traverse • Compute rectangular coordinates from polar coordinates for site layout • Compute polar coordinates from rectangular coordinates for site layout
4.	Site stormwater requirements • Identify site stormwater requirements • Identify the means and methods used to control soil erosion and sediment • Identify the duties of a Certified Storm Water Operator
5.	Field engineering calculations • Compute surface areas • Compute cuts and fills for grading • Compute grades and inverts of structures • Compute horizontal and vertical curves
6.	Field operations documentation • Identify the content required for an effective construction report • Identify Miss Dig requirements for underground excavation • Identify the necessary items on a temporary facilities site plan
7.	Building codes and regulations • Search the International Building Code for code requirements • Explain assigned IBC code requirements for design and construction • Identify inspections required for a commercial building • Assess the importance of communicating with construction inspection staff

8.	Special topics in field engineering • Investigate current and emerging technologies in construction • Identify resources to produce cost effectiveness and efficiencies • Identify how risk, safety, politics, ethics, the economy, and other factors influence the construction industry.
9.	Sustainability in construction • Examine sustainable practices in construction
10.	Evaluations

Learning Outcomes for Each Laboratory Unit

Upon Completion of each laboratory unit, the learner will be able to satisfactorily:

1.	Vertical control • Set bench marks and temporary bench marks using differential leveling techniques • Record field data in a proper format • Compute elevations and closures from field data
2.	Structure layout and grading • Layout a rectangular coordinate grid system for a site plan • Compute and layout structures by using computed polar coordinates from rectangular coordinates • Compute and set cut/fill stakes for structures by using computed grades and elevations shown on site plans • Perform as-built operations to verify layout • Compute and layout horizontal road alignment
3.	Measuring distances • Accurately measure horizontal distances with a 100’ tape • Accurately measure horizontal distances with a Total Station • Record field data in a proper format
4.	Horizontal control • Accurately measure horizontal angles in a closed traverse • Record field data in a proper format • Compute the geometric error of closure and adjustment • Compute coordinates of control points
5.	Field engineering calculations • Compute surface areas • Compute material volumes from field data and site plans • Compute azimuths and bearings

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Course Outline

6.	International Building Code • Research the International Building Code for code requirements • Through written and oral presentations, explain assigned IBC code requirements for design and construction
7.	Special topics in field engineering • Research a chosen special topic in field engineering • Through written and oral presentations, explain how this special topics influences the construction industry
8.	Construction documentation • Prepare and submit an electronic temporary facilities plan • Prepare and submit standard construction documents • Prepare and submit accurate field data

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 311 Temporary Structures and Concrete Formwork

Credits: 3 Hours

Contacts: 3 Lectures

Course Description: Design, erection, use and removal of temporary structures used in the construction industry with an emphasis on concrete formwork. Basic rigging operations introduced.

Course Prerequisites: CONM 212, 221, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+; PHYS 211

Required Textbooks: Peurifoy & Oberlender (2011). *Formwork for Concrete Structures*, 4th Edition. Ferris Book Store.

Souder, Chris (2015). *Temporary Structure Design*. Ferris Book Store.

Required Materials: Calculator with exponential functions
Engineering and architectural scales

Course Learning Outcomes

1. Calculate the basic loads and forces on temporary structures.
2. Recognize the major elements of construction rigging.
3. Identify the most common materials and methods used in concrete installation (ACCE SLO #8).
4. Calculate design loads and pressures in formwork applications.
5. Select formwork members from applied loads and pressures (ACCE SLO#8, #19).

Assessment Methods:

ACCE SLO #8 Analyze methods, materials, and equipment used to construct a project.
Assignment- create a concrete formwork plan.

ACCE SLO #19 Understand the basic principles of structural behavior.
Test-Internal: Analyze structural behavior of concrete formwork

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Structural Theory	1	2	
3.	Temporary Structures	1	9	
4.	Formwork Planning and Loads	4	10	
5.	Formwork Layout	3	7	
6.	Formwork Construction and Usage	3	7	
7.	Special Techniques	3	3	
8.	Rigging	2	3	
9.	Evaluations		3	
	Total Hours		45	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Know course goals, policies and procedures B. Know course requirements and assessment methods C. Understand the relevance of the course material within the construction industry	
2.	Structural Theory A. Apply structural design methods from CONM 221 B. Evaluate forces and loads of temporary structures C. Construct load, shear and moment diagrams for a temporary structure	 1 1 1
3.	Temporary Structures A. Know the primary types of temporary structures used in the construction industry B. Know the safety requirements of temporary structures C. Plan a construction sequence for a temporary structure D. Select temporary structure sizes from equations and tables	 5
4	Formwork Planning and Loads A. Know the inter-relationships of safety, quality and economy B. Know overall formwork objectives C. Know how to select material properties D. Develop a basic formwork plan from construction documents E. Calculate lateral pressures of freshly placed concrete	 3 4
5	Formwork Layout A. Know how formwork is erected and dismantled B. Understand site management and site logistics in formwork operations C. Determine bracing size and spacing D. Calculate wall and column formwork member sizes	 5 5
6	Formwork Construction and Usage A. Know the major types of formwok systems and their usage B. Develop a formwork assembly plan for a specific project C. Develop a formwork safety plan D. Know the uses and types of formwork accessories	 3 3
7	Special Techniques A. Know the requirements for cold weather concreting B. Know the requirements for mass concreting	 3 3
8	Rigging A. Know the basic uses of typical rigging devices B. Know basic OSHA hand signals C. Determine forces in rigging cables and straps D. Select rigging member sizes from tables	 2 2 1

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Course Outline

No.	Topic	CLO(s)
9	Evaluations A. Temporary Structures B. Formwork Planning C. Formwork Design D. Rigging	

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Course Outline

Last Revision Date:	August 22, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Lee Templin

Course: CONM 312 Construction Scheduling

Credits: 3 Hours

Contacts: 2 Lecture, 2 Lab Hours per Week

Course Description: Develop construction planning and scheduling techniques, including work breakdown, crew analysis and productivity, activity time-cost relationships, project time-cost relationships, resource leveling, overlapping activity relationships and lag, and project cash flow. Computer application is used as a scheduling tool throughout the course.

Course Prerequisites: CONM 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Construction Planning and Scheduling Manual, 2nd Edition, AGC

Required Materials:

Course Learning Outcomes

1. Develop an activity listing and corresponding durations for a construction project. (ACCE SLO #5)
2. Develop a construction schedule, manually and electronically. (ACCE SLO #5, #10)
3. Perform a resource allocation on a schedule. (ACCE SLO #16)
4. Calculate activity values and cost load the corresponding schedule. (ACCE SLO #14, #16)
5. Present a finalized construction schedule. (ACCE SLO #2, #5)

Assessment Methods:

ACCE SLO #5 Create construction project schedules.
Assignment: Develop a construction schedule given a network diagram.

ACCE SLO #10 Apply electronic-based technology to manage the construction process:
Assignment: update a project using a schedule software program.

ACCE SLO #16 Understand construction project control processes.
Assignment: Demonstrate the earned value analysis system for construction projects.

ACCE SLO #2 Create oral presentation appropriate to the construction discipline. Presentation (oral): Individual assessment of communication skills during team project presentation.

Instructional Unit Topic Descriptions and Time Allocations*

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	0
2.	Project Definition and Role of Planning	1	1	2
3.	Activity Delineation	1	2	2
4.	Activity Duration	1	2	2
5.	Precedence Diagramming Method	2	4	4
6.	Resource Loading	3	3	4
7.	Cost Loading	4	3	4
8.	Progress Measurement	4	3	4
9.	Schedule Compression		3	2
10.	Specialized Scheduling Techniques	2	3	2
11.	Construction Schedule Reports	5	2	4
12.	Examinations		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic
1.	Introduction and orientation. A. Discuss the course organization and course goals. B. Identify the supporting references, including application tools. C. State the instructor's expectations, attendance and grading policies.
2.	Project definition, role of planning. A. Review the definition of a project. B. Identify goals of planning efforts in delivering project objectives. C. Differentiate between planning and scheduling. D. Discuss the role of scheduling in project management.
3.	Activity delineation. A. Develop a work breakdown structure (WBS) for a proposed building B. Define goals for WBS development C. Define activity types and categories. D. Create activity codes with scheduling application.
4.	Activity durations. A. Calculate activity duration with known productivity rates. B. Determine the impact of resource selection on production rates. C. Estimate the influences of seasonal and weather effects on production rates. D. Evaluate the impact of resource limitation on activity durations.
5.	Precedence diagramming method. A. Compare activity-on-arrow with activity-on-node. B. Discuss the use of overlapping relationships in developing construction schedules. C. Calculate the forward pass and backward pass scheduling values. D. Calculate the total float values and the free float values. E. Determine the critical path using various methods.
6.	Resource loading. A. Describe the different types of resources in the construction industry. B. Explain the importance of resource loading a construction schedule. C. Create the daily resource histograms and cumulative resource usage curves for a project. D. Describe the effects of limited resources to a construction schedule. E. Describe the objectives of resource leveling a project schedule
7.	Cost loading. A. Distribute the appropriate project costs through cost assignments to activities. B. Recognize the difference between direct costs and indirect costs. C. Generate the project cash flow based on the target schedule and explain the different cash flows.
8.	Progress measurement. A. Update a construction schedule to determine project progress. B. Determine project progress utilizing percent completion and remaining duration methods. C. Given project data, calculate the planned value, earned value, actual cost as well as schedule and cost variances using Earned Value Analysis. D. Analyze the update schedule and compare to the original schedule.

9.	Schedule compression. A. Apply the compression steps to achieve a minimum project duration at least cost possible. B. Analyze activity duration with respect to resource allocation in the Activity-Time Cost Curve. C. Calculate the minimum cost for a given project network with possible activity duration reductions. D. Create the Project Time-Cost Curve for the given project network.
10.	Specialized scheduling techniques. A. Define Project Evaluation and Review Technique (PERT) and its application to project schedules. B. Explain the application of linear scheduling method to construction projects. C. Describe the LEAN process as it relates to the construction industry.
11.	Construction schedule reports. A. Describe the different schedule formats used in the construction industry. B. Use scheduling application to generate various schedule reports and diagrams. C. Use scheduling application to generate cost and earned value analysis reports.
12.	Examinations

Minimum Required Student Laboratory Activities

2.	Project Definition, Role of Planning: A. Describe the planning steps for project schedule development. B. Use a manual method to develop a preliminary construction schedule. C. Set up a new project in the scheduling application.
3.	Activity Delineation: A. Develop activity categories and activity types for a project. B. Create an activity list for a project. C. Define activity codes in the scheduling application.
4.	Activity Duration: A. Calculate the activity duration for a project. B. Employ the activity duration information into the scheduling application.
5.	Precedence Diagramming Method: A. Determine the logical relationships between activities of a project. B. Enter the relationships information into the scheduling application. C. Generate scheduling reports from the scheduling application.
6.	Resource Loading: A. Determine the resources required for each activity in a project. B. Develop a resource list for a project. C. Create the resource histograms and cumulative resource usage curve for a project. D. Create the resource list in the scheduling application. E. Enter the resource information into the scheduling application. F. Generate different resource reports from the scheduling application.

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Course Outline

7.	Cost Loading: A. Determine the value for each activity. B. Enter the cost information into the scheduling application. C. Generate different cost reports from the scheduling application.
8.	Progress Measurement: A. Using given project information, prepare an updated construction schedule. B. Determine the planned value, earned value, and actual cost for a project. C. Ester the update project information into the scheduling application. D. Generate the associated updated reports from the scheduling application.
9.	Schedule Compression: A. Develop an Activity-Time Cost Curve for selected activities. B. Develop a Project Time-Cost Curve for a project
10.	Specialized Scheduling: A. Describe the benefits and the detriments in using PERT for project schedules. B. Describe the linear scheduling method and its appropriate utilization in construction scheduling.
11.	Construction schedule reports. A. Develop a construction schedule for a group project. B. Present the group project's schedule to the class and instructor.

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Course Outline

Last Revision Date:	August 22, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Lee Templin

Course: CONM 321 Construction Estimating II

Credits: 3 Hours

Contacts: 3 Lecture Hours per Week

Course Description: The development of unit prices for estimating labor, material and equipment, productivity adjustment factors, overhead and profit, cash flow and interest calculations, conceptual estimating methods, and cost variance analysis.

Course Prerequisites: CONM 211, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Course Handout

Required Materials: RS Means Building Construction Cost Data (20XX), Kingston, MA

Course Learning Outcomes

1. Develop conceptual estimate using various methods. (ACCE SLO #4)
2. Analyze factors that impact your unit costs and productivity. (ACCE SLO #8)
3. Describe overhead allocation and profit determination. (ACCE SLO #14)
4. Understand construction cost control. (ACCE SLO #14)
5. Understand basic statistical techniques.

Assessment Methods:

ACCE SLO #4 Create construction project cost estimates.
Assignment: Create a conceptual estimate.

ACCE SLO #8 Analyze methods, materials, and equipment used to construction a project.
Assignment: Calculate unite prices for labor, material, and equipment.

ACCE SLO #14 Understand construction accounting and cost control.
Assignment: Determine the overhead and profit for a project. Calculate cost variances for an activity.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations*

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	0
2.	Probability and Statistical Analysis	5	2	0
3.	Equipment Production	2	3	0
4.	Material Handling and Site Layout	2	3	0
5.	Labor Productivity Factors	2	2	0
6.	Work Improvement Methods	2	3	0
7.	Labor Agreements, Labor Burden and Safety Costs	2	3	0
8.	Overhead Calculations, Bond Premiums and Profit	3	6	0
9.	Material Components and Unit Costs	2	5	0
10.	Conceptual Estimating Methods	1	6	0
11.	Cash Flow Projected Revenue and Interest Calculations	4	3	0
12.	Cost Variance Analysis	4	3	0
13.	Examinations		3	0
	Total Hours		45	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic
1.	Introduction and Orientation A. Discuss the course organization and course goals. B. Identify the supporting references. C. State the instructor's expectations, attendance and grading policies.
2.	Probability and Statistical Analysis A. Use basic probability terms and techniques. B. Calculate basic statistical values given certain population and samples.
3.	Equipment Production A. Identify various equipment cost components. B. Identify equipment productivity factors. C. Calculate the equipment productivity and associated equipment unit costs.
4.	Material Handling and Site Layout A. Discuss site layout methodology and techniques. B. Discuss material handling techniques. C. Identify the temporary facilities and storage requirements on the construction project site.
5.	Labor Productivity Factors A. Identify the typical labor productivity adjustment factors. B. Discuss the geographic and labor productivity adjustment factors.
6.	Work Improvement Methods A. Discuss work flow sampling method and its collection process B. Discuss sampling methods' & their data collection elements. C. Calculate the labor efficiency factor.
7.	Labor Agreements, Labor Burden and Safety Costs A. Search the reference materials to find current labor costs and worker compensation rates. B. Search a labor agreement to find specific information regarding provisions of the contract. C. Identify the labor burden items and the associated costs. D. Calculate the total labor cost per hour for selected trades.
8.	Overhead Calculations, Bond Premiums and Profit A. Identify the project and percentage overhead items. B. Calculate the cost of each overhead item. C. Prepared balanced and unbalanced bids for a project. D. Discuss subcontractor bid scope comparison. E. Discuss the different types of bonds and associated bonding criteria. F. Calculate the bond premiums. G. Discuss the factors that determine the profit margin

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Course Outline

9.	Material Components, Unit Costs A. Search the Cost databases to find current material prices. B. Identify the cost items in a particular assembly to determine the assembly's unit cost. C. Compare different assemblies for their components and associated unit cost.
10.	Conceptual Estimating Methods A. Understand the purpose of different conceptual estimating methods. B. Develop a project conceptual estimate based on square footage method. C. Develop a project conceptual estimate based on assemblies and systems.
11.	Cash Flow Projected Revenue & Interest Calculations A. Discuss the proper allocation of labor, material, equipment, subcontractors, and overhead B. Develop the projected revenue for a project. C. Calculate the total interest on the short term construction loan, D. Graph the expenditures. Income, the overdraft, and the unbalanced
12.	Cost Variance Analysis A. Calculate the Labor Variance B. Calculate the Material Variance C. Calculate the Quantity Variance D. Determine the Productivity Variance
13.	Examinations

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Course Outline

Last Revision Date:	September 15, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Suzanne Miller

Course: CONM 324 Advanced Construction Computer Techniques and Technology

Credits: 3 Hours

Contacts: 2 Lecture Hours and 2 Lab Hours per week

Course Description: Understanding emerging technologies used in the solution of construction problems and in construction management. This will include PC-based office software; project management software; and new industry technologies.

Course Prerequisites: CONM 117, 122, 211, 225, 222

Required Textbooks: Coursepack available on Ferris Connect – updated as software is updated

Technical guides for software as appropriate

Required Materials: Flashdrives

Course Learning Outcomes

1. Demonstrate proficiency in the use of software application used in construction operations (ACCE SLO# 4, 10)
2. Apply a variety of construction industry-specific technologies to construction projects (ACCE SLO# 4, 10)

Assessment Methods:

ACCE SLO #4 Create construction project cost estimates.
Project: create an interactive spreadsheet for completing a cost estimate.

ACCE SLO #10 Apply electronic-based technology to manage the construction process.
Assignment: Use project management software to manage a construction project's information.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction, file management		1	1
2.	Advanced applications of Office software	1	2	2
3.	Presentation software	1	2	2
4.	Construction-related applications of spreadsheet software	1	4	4
5.	Quantity takeoff and estimating technology	1	3	3
6.	Advanced scheduling software	1	2	2
7.	Project Management software	1	10	10
8.	Update on field software and site technology	1,2	5	5
9.	Evaluation		1	1
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction A. Computer lab environment. B. Electronic file manipulations and file structures	
2.	Other advanced applications of Office A. Word editing B. Object Linking and Embedding C. Program-specific Help and Wizards	1
3.	Presentation Software A. Multi-media presentations for the industry	1

Course Outline

No.	Topic	CLO(s)
4.	Construction-related applications of Excel. A. Worksheets and workbooks (Function wizards, Conditional Formatting, Goal Seek, etc.). B. Forms for repetitive and protected use. C. Databases D. Dynamically linked forms	1
5.	Quantity takeoff and estimating technology A. Quantity takeoffs of varying materials and conditions	1
6.	Advanced scheduling software A. Integrate schedules with 4D software B. Create links to object properties files and scheduling files in external databases	1
7.	Project Management A. Flow of information B. Budget management C. Team coordination	1
8.	Field Software and Technology A. Industry's current technology uses	1,2

Minimum Required Student Laboratory Activities

No.	Topic	CLO(s)
1.	Introduction A. Manage the computer lab environment. B. Manage electronic file manipulations and manage a file structure	
2.	Other advanced applications of Office A. Word editing B. Object Linking and Embedding C. Program-specific Help and Wizards	
3.	Presentation Software A. Create a multimedia presentation	
4.	Construction-related applications of spreadsheets A. Demonstrate the ability to use advanced functions and features in the preparation of electronic worksheets and workbooks (Function wizards, Conditional Formatting, Goal Seek, among others). B. Demonstrate the understanding of and ability to create forms for repetitive and protected use. C. Demonstrate the ability to create databases of information and dynamically link forms to these databases. D. Demonstrate the ability to design a complex worksheet through methods of logic and	

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Course Outline

No.	Topic	CLO(s)
	programming using flowcharts or other forms of logic diagramming.	
5.	Quantity takeoff and estimating technology A. Demonstrate how to use industry applications for quantity takeoffs of varying materials and conditions	
6.	Project Management A. Manage the flow of information between team members B. Budget management through project software	
7.	Field Software and Technology A. Demonstrate the use of current field technology	

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Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 373 Professionalism and Ethics in Construction

Credits: 1 Hour

Contacts: 1 Lecture Hour

Course Description: The study of professional ethics and leadership as related to the construction industry. Discusses the codes of ethics adopted by many technical societies. The course explores the meaning and attributes of professionalism along with the moral, ethical, and social responsibilities of professional constructors. This course may be team taught by several or one Construction Management faculty.

Course Prerequisites: CONM 211, 222, 225

Course Co-requisites: ENGL 311

Required Textbooks: Smith, Jason A (2011). *Construction Management: Understanding and Leading an Ethical Project Team.* Sigma Lambda Chi.

Fleddermann, Charles B (2004). *Engineering Ethics*. Ferris Book Store.

Required Materials: Supplemental reading materials provided by Instructor(s)

Course Learning Outcomes

1. Evaluate the major theories of ethics.
2. Understand professional codes of ethics.
3. Develop leadership and ethical project management skills for the construction industry.
4. Develop personal skills for facing ethical dilemmas (ACCE #6).

Assessment Methods:

ACCE SLO #6 Analyze professional decisions based on ethical principles.
Written product: Report on an interview with a construction professional

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	History of Ethical Thought	1	1	
3.	Moral Theories of Ethics	1	2	
4.	Professionalism and Codes of Ethics	2	1	
5.	Ethical Problem Solving	3	1	
6.	Rights and Responsibilities of Professionals	2	1	
7.	Ethical Case Study Evaluations	3	1	
8.	Ethical Techniques	4	1	
9.	Facing an Ethical Dilemma	4	1	
10.	Ethical Issues in the Construction Industry	3	2	
11.	Leadership Skills and Ethical Project Management Techniques	3	2	
12.	Holidays		0	
13.	Evaluations		1	
	Total Hours		15	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Know course goals, policies and procedures B. Know course requirements and assessment methods C. Understand the relevance of the course material within the construction industry	
2.	History of Ethical Thought A. Explain ethics in western culture B. Describe the ethical foundations of major ethical philosophers C. Evaluate a classical ethical writing	1
3.	Moral Theories of Ethics A. Define the ethical tenets of Utilitarianism B. Define the ethical tenets of Duty Ethics C. Define the ethical tenets of Rights Ethics D. Define the ethical tenets of Virtue Ethics	 1 1 1 1
4	Professionalism and Codes of Ethics A. Define the attributes of a Professional Constructor B. Recognize the historical codes of ethics in the design and construction professions C. Explain how codes of ethics function in society D. Discuss a code of ethics for the construction industry E. Prepare a personal code of ethics	2
5	Ethical Problem Solving A. Define the factual issues in an ethical context B. Evaluate the conceptual issues in an ethical context C. Demonstrate use of ethical problem solving techniques	
6	Rights and Responsibilities of Professionals A. Describe the responsibilities of a professional in the construction industry B. Describe the rights of a professional in the construction industry C. Identify ethical issues with conflicts of interest D. Explain the issues involved with whistleblowing	
7	Ethical Case Study Evaluations A. Evaluate ethical case studies using critical thinking skills B. Determine ethical issues involved in selected case studies C. Analyze choices made in ethical case studies D. Develop and substantiate positions taken on ethical case studies E. Forecast potential outcomes of alternative ethical choices	 2 2 4 4
8	Ethical Techniques A. Apply line drawing to evaluating ethical problems B. Apply flow charting to evaluating ethical problems	 4 4

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Course Outline

No.	Topic	CLO(s)
9	Facing an Ethical Dilemma A. Discuss how to face an ethical dilemma B. Understand the issue of personal accountability in ethical decision making	
10	Ethical Issues in the Construction Industry A. Identify the ethical issues in construction bid shopping B. Identify the ethical issues in construction materials testing C. Identify the ethical issues in construction subcontracting D. Identify the ethical issues in construction fiduciary responsibility	 3 3 3 3
11	Leadership Skills and Ethical Project Management Techniques A. Understand the leadership skills required for a career as a professional constructor B. Understand ethical project management skills required for a career as a professional constructor	
12	Professional Interview A. Conduct an interview with a professional constructor on an ethical issue B. Summarize observations, analysis, and conclusions in professional writing format	 4 4
13	Evaluations A. Professional Report on interview with a construction professional	 3
14	Final Examination – Comprehensive Exam	

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 412 Construction Contracts

Credits: 3 Hours

Contacts: 3 Lectures

Course Description: The study of the construction contract as it relates to the administration of the construction project. Review of standard documents used in the construction industry. Interpretation of required administrative procedures and the evaluation of contractual risk.

Course Prerequisites: CONM 222, 225, 312, 321; ENGL 311; BLAW 301

Required Textbooks: Cook, C.W. (2014). *Successful Contract Administration for Constructors and Design Professionals*, London and New York. Routledge. OR

White, N.J. (2002*). Principles and Practices of Construction Law.* Prentice Hall.

Required Materials: Construction documents for the case studies

Standard construction documents as determined by Instructor

Course Learning Outcomes

1. Compare and contrast the standard documents used in the construction industry. (ACCE SLO#12)
2. Interpret administrative procedures required by the contract documents.
3. Application of general business law as it applies to the construction industry. (ACCE SLO#17)
4. Evaluate inherent contractual risk. (ACCE SLO # 13)

Assessment Methods:

ACCE SLO #12 Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
Test- Internal: Describe contractual relationships between construction parties

ACCE SLO #17 Understand the legal implications of contract, common, and regulatory law to manage a construction project.

ACCE SLO #13 Understand construction risk management.

Test-Internal. Evaluate scenarios of different risk situations.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	0
2.	Contracts, Torts, Statutes and Regulations	3	2	0
3.	Owners, Designers and Constructors		1	0
4.	Construction Contracts	1,3	2	0
5.	Construction Contract Delivery Methods	2	2	0
6.	Interpreting Construction Contracts	2	3	0
7.	Killer Clauses	4	3	0
8.	Insurance	1	2	0
9.	Bonds	1	2	0
10.	Warranties	1	2	0
11.	Change Orders	1	2	0
12.	Differing Site Conditions	4	2	0
13.	Schedule	2	2	0
14.	Liens	2	2	0
15.	Tort Law	3	2	0
16.	Statutes and Regulations	2,3	2	0
17.	Project Closeout		2	0
18.	Dispute Resolution		2	0
19.	Ethics		2	0
20.	Subcontractors and Suppliers		2	0
21.	Assessment of Damages	4	2	
14.	Evaluations		3	0
	Total Hours		45	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Know course goals, policies and procedures B. Know course requirements and assessment methods C. Understand the relevance of the course material within the construction industry	
2.	Contracts, Torts, Statutes and Regulations A. Recognize historical foundations for the existing legal system B. Identify commonly used pre-printed contracts C. Understand the importance of tort law in relation to the construction industry D. Understand the importance of statutes and regulations E. Know the importance of ethics in the construction workplace F. Analyze fundamental challenges of contract administration	1
3.	Owners, Designers and Constructors A. Know the major elements and types of construction contracts B. Know the roles, responsibilities and relationships in delivery methods C. Know the concerns of public private partnerships	
4	Construction Contracts A. Understand what is and is not a contract B. Recognize what constitutes the entire contract C. Differentiate between different types of contracts D. Understand contract issues regarding changes E. Recognize standard forms of the construction contract F. Contrast the differences of standard available contract forms G. Contrast the contractual differences of delivery systems	1,3
5	Construction Contract Delivery Methods A. Recognize different types of contract delivery methods B. Understand the duties of professional constructors in different delivery methods C. Contrast the differences of the standard available contract forms D. Analyze the appropriateness of contract delivery methods E. Understand contractual expectations in administering different delivery methods	1,2
6	Interpreting Construction Contracts A. Know the importance of interpreting construction contracts as a whole B. Know the meaning and use of critical contract terms C. Analyze contract interpretation in relation to responsibilities of all parties D. Understand the relationship of contract documents in resolving ambiguities E. Determine the importance of dealing with the entire project team with obligations F. Appraise the legal implications of construing a document against the drafter	2
7	Killer Clauses A. Recognize the importance of reading the contract in its entirety B. Know why specific clauses should be researched C. Understand the importance of payment and change order clauses to those researched	4

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No.	Topic	CLO(s)
	D. Know the role of the contract administrator to those clauses researched E. Evaluate actual costs vs. billable costs F. Know how to track compliance with those clauses researched	
8	Insurance A. Understand the challenges of assuming liability for issues or events on a project B. Contrast types of insurance and the purposes of each kind C. Know the contractual differences between employees and subcontractors D. Understand the purpose of Workers Compensation Insurance E. Calculate the effect of an experience modifier on the cost of insurance F. Understand the effect and consequences of misclassification of work on iinsurance costs	1
9	Bonds A. Recognize the different types of bonds B. Know the difference between responsible and responsive bids C. Know the three Cs of Bonding D. Understand issues related to bonding capacity E. Know the effects of The Miller Act and The Little Miller Act F. Understand issues and obligations in relation to defending bond claims	1
10	Warranties A. Understand warranties and their importance in closing out a project B. Evaluate Contractor responsibility for warranty obligations C. Identify warranty periods in relation to Suppliers D. Understand Apparent and Implied Authority from the Owner relative to inspections E. Know the concept of building commissioning relative to warranties F. Compare the rights and duties of all parties in project closeout G. Compare the rights and duties of all parties during the warranty phase	1
11	Change Orders A. Know the importance of the change order clause B. Recognize the steps in the change order approval process C. Describe the effects of time in relation to the change order process D. Understand the full impact of cost related to changes E. Determine the responsibility for initiating and approving changes F. Know the impact for deteriorated relationships when negotiating change orders	2
12	Differing Site Conditions A. Know the difference between Type I and Type II Differing Site Conditions B. Know the conditions for Type I and Type II Differing Site Conditions C. Organize procedures for notifying and administering Type I and Type II Conditions D. Understand risk and responsibility with Differing Site Conditions clauses E. Understand the importance of timely notice	4
13	Schedule A. Recognize the importance of the schedule in delivering the project to the Owner B. Differentiate between compensable and non-compensable delays C. Understand the intent and issues with liquidated damages D. Analyze the different types of construction acceleration E. Evaluate the timely elements of a delay claim	2

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No.	Topic	CLO(s)
	F. Assemble the different costs associated with a delay claim	
14	Liens A. Know what a Mechanic Lien is B. Differentiate between a lien and a payment bond C. Recognize other terms for a Mechanic Lien D. Understand the importance of lien releases E. Analyze Owner concerns related to liens	2
15	Tort Law A. Describe the importance of tort law B. Analyze the consequences of negligence on the project C. Assess what constitutes intentional torts D. Understand responsibility for strict liability torts E. Recognize the Attractive Nuisance elements of construction liability F. Evaluate contract administration actions relating to the legal issues of protecting people and property	3
16	Statutes and Regulations A. Recognize the broad extent of statutes aand regulations B. Understand the importance of proper licensing, permitting, and building codes C. Identify and analyze critical issues of statutes and regulations D. Identify environmental issues E. Analyze issues and actions relative to bankruptcy F. Analyze issues and actions relative to dispute resolution G. Analyze issues and actions relative to hiring, firing, and workplace conduct	3
17	Project Closeout A. Analyze priorities B. Know the typical requirements C. Know the effective use of the punch list D. Evaluate post-project efforts for future improvement	
18	Dispute Resolution A. Recognize and understand different forms of dispute resolution B. Apply principles of dispute resolution to best practices for different situations C. Understand and interpret the relative merits of court, mediation, and arbitration D. Describe the roles and responsibilities of contract administration in dispute resolution E. Evaluate how to prepare for dispute resolution processes	
19	Ethics A. Know the importance of ethics in a professional environment B. Recognize how individual and group ethics are separate yet interdependent C. Interpret ethical behavior in regard to group interaction D. Analyze personal ethics for improved personal success E. Develop approaches for encouraging organizational ethical transformation	
20	Subcontractors and Suppliers A. Know the difference between subcontractors and suppliers B. Understand the Owner's control of subcontractor selection C. Understand subcontractor coordination D. Understand issues of subcontractor payment	

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No.	Topic	CLO(s)
	E. Know contract requirements in dealing with subcontractor claims F. Know the issues of conditional assignment of the subcontract to the Owner	
21	Assessment of Damages A. Understand compensatory and consequential damages B. Understand the duty to mitigate damages C. Know the major types of Owner's damages D. Know the major types of Contractor's damages E. Know the use of limitation of liability clauses F. Know the issues of tort claims alleging negligence G. Know the issues of recovery damages in the absence of an express contract	4

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	John R Schmidt

Course: CONM 413 Construction Economics

Credits: 3 Hours

Contacts: 3 Lectures

Course Description: Economic and financial factors in the construction industry environment to be considered in managerial decision making. Emphasizes the time value of money concept.

Course Prerequisites: CONM 222, 225, 321; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Newnan, Donald G., et al., Engineering Economic Analysis, Latest Edition. Oxford University Press, New York, NY.
(May be used as Reference per Professor's preference.)
(At time of writing: 11th Ed., 2012. ISBN: 978-0-19-977804-1)

Required Materials: Engineering calculation paper and calculator.
(Cell phones are not acceptable replacements.)

Course Learning Outcomes

1. Perform comparative analyses using common techniques of "Engineering Economic Analysis".

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Prerequisite Review		2	
2.	Introduction to Construction Economics		2	
3.	Engineering Costs and Cost Estimating		2	
4.	Payback Analysis	1	2	
5.	Interest and Equivalence		7	
6.	Annuities		4	
7.	Gradients		4	
8.	Effective Interest		3	
9.	Net Present Worth Analysis	1	3	
10.	Equivalent Uniform Annual Cash Flow Analysis	1	3	
11.	Rate of Return and Incremental Rate of Return	1	3	
12.	Other Analysis Techniques	1	3	
13.	Comparison of the Major Analysis Techniques		1	
14.	Evaluations		6	
	Total Hours		45	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Prerequisite Review A. Identify the Math concepts necessary for successful completion of the course. B. Demonstrate minimum requirements for successful use of basic Math skills. C. Demonstrate minimum requirements for successful use of Trigonometry. D. Demonstrate minimum requirements for successful use of Linear Interpolation.	
2.	Introduction to Construction Economics A. Identify the type of problem that can be solved using the methods of Engineering Economic Analysis (EEA). B. Name and order the EIGHT steps in Rational Decision Making and be able to describe the meaning of each of these. C. Name the NINTH step in Rational Decision Making and be able to describe its meaning.	
3.	Engineering Costs and Cost Estimating A. Describe or identify the various types of engineering costs. B. Develop a Cash Flow Table and draw a Cash Flow Diagram (CFD). C. Demonstrate incorporation of expenses and receipts as they relate to Cash Flows.	
4.	Payback Analysis A. Describe the most basic of uses of Payback Analysis. B. Determine the Payback Period of an economic alternative. C. Use Payback analysis to conduct a comparison of two or more alternatives. D. Recognize the potential for a deeper analysis using Payback and the time value of money. E. Recognize the benefits and limitations of Payback Analysis.	1
5.	Interest and Equivalence A. State the expression (equation) for the relationship of a Future Value to a Present Value, simple interest, and time. B. Use the equation for Simple Interest. C. Understand the concept of Compound Interest. D. State the expression (equation) for the relationship of a Future Value to a Present Value, compound interest, and time. E. Use the equation for Compound Interest. F. Develop the Cash Flow Diagram for a given set of economic conditions. G. Compute equivalent sums of money for various cash flow scenarios. H. Use the Single Payment Compound Amount formula. I. Use the Single Payment Present Worth formula. J. Use the Single Payment Compound Amount Factor. K. Use the Single Payment Present Worth Factor. L. Use of the Table of Compound Interest Factors. M. Determine the value of the Single Payment Compound Amount Factor using the Table of Compound Interest Factors. N. Determine the value of the Single Payment Present worth Factor using the Table of Compound Interest Factors.	

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No.	Topic	CLO(s)
	O. Linearly interpolate the approximate value of Compound Interest Factors for a value of n (periods) NOT explicitly calculated in the table. P. Linearly interpolate the approximate value of Compound Interest Factors for a value of i (interest) NOT explicitly calculated in the table. Q. Identify the differences and limitations of the Table of Compound Interest Factors versus using the full mathematical formula.	
6.	Annuities A. Recognize a Uniform Series, also known as an Annuity, represented by the variable A. B. Exercise the concept of end-of-period event. C. Recognize and use the relationship of the equation for Uniform Series Compound Amount and the "mold" of its Cash Flow Diagram. D. Use the Uniform Series Compound Amount Factor in the appropriate equation. E. Determine the Future Value using the Uniform Series Compound Amount Factor and the Table of Compound Interest Factors. F. Recognize and use the relationship of the equation for Uniform Series Sinking Fund and the "mold" of its Cash Flow Diagram. G. Use the Uniform Series Sinking Fund Factor in the appropriate equation. H. Determine the Annuity Value using the Uniform Series Sinking Fund Factor and the Table of Compound Interest Factors. I. Recognize and use the relationship of the equation for Uniform Series Present Worth and the "mold" of its Cash Flow Diagram. J. Use the Uniform Series Present Worth Factor in the appropriate equation. K. Determine the Principal (Present) Value using the Uniform Series Present Worth Factor and the Table of Compound Interest Factors. L. Recognize and use the relationship of the equation for Uniform Series Capital Recovery and the "mold" of its Cash Flow Diagram. M. Use the Uniform Series Capital Recovery Factor in the appropriate equation. N. Determine the Annuity Value using the Uniform Series Capital Recovery Factor and the Table of Compound Interest Factors.	
7.	Gradients A. Recognize an Arithmetic Gradient, represented by the variable A. B. Exercise the concept of end-of-period event. C. Recognize and use the relationship of the equation for Arithmetic Gradient Present Worth Factor and the "mold" of its Cash Flow Diagram. D. Use the Arithmetic Gradient Present Worth Factor in the appropriate equation. E. Determine the Principal (Present) Value using the Arithmetic Gradient Present Worth Factor and the Table of Compound Interest Factors. F. Recognize and use the relationship of the equation for Uniform Series Present Worth Factor and the "mold" of its Cash Flow Diagram. G. Use the Uniform Series Present Worth Factor in the appropriate equation. H. Determine the Principal (Present) Value using the Uniform Series Present Worth Factor and the Table of Compound Interest Factors. I. Recognize and use the relationship of the equation for Arithmetic Gradient Uniform Series Factor and the "mold" of its Cash Flow Diagram. J. Use the Arithmetic Gradient Uniform Series Factor in the appropriate equation. K. Determine the Annuity Value using the Arithmetic Gradient Uniform Series Factor and the Table of Compound Interest Factors.	

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Course Outline

No.	Topic	CLO(s)
	L. "Break down" cash flow diagrams into pieces that can be used with the previously developed Factors.	
8.	Effective Interest A. Compare and contrast: Nominal Interest Rate (r) and the Effective Interest Rate (i_a, referred to in this course as i_e). B. Compare and contrast: Number of Compounding Periods (n) and the Number of Compounding Subperiods (m). C. Demonstrate the relationship between: Nominal Interest Rate (r), Number of Compounding Subperiods (m), and the Interest Rate per Compounding Period (i). D. Demonstrate the relationship between: Nominal Interest Rate (r), Effective Interest Rate (i_e), Number of Compounding Periods (n), Number of Compounding Subperiods (m), and Interest Rate per Compounding Period (i). E. Calculate the unknown when given all other variables related to: Nominal Interest Rate (r), Effective Interest Rate (i_e), Number of Compounding Periods (n), Number of Compounding Subperiods (m), and Interest Rate per Compounding Period (i).	
9.	Net Present Worth Analysis A. Calculate the Net Present Worth of a single alternative. B. Use Present Worth (PW) Analysis to compare two or more alternatives. C. Recognize the economic criteria related to Inputs, Outputs, Costs, and Benefits as they apply to Present Worth Analysis. D. Demonstrate an understanding of the purpose and use of methods for considering Equal Planning Horizons in making valid comparisons as it relates to Present Worth Analysis. E. Use the concept of Capitalized Cost for infinite analysis periods.	1
10.	Equivalent Uniform Annual Cash Flow Analysis A. Calculate the Equivalent Uniform Annual Cost or Benefit of a single alternative. B. Use Annual Cash Flow Analysis to compare two or more alternatives. C. Recognize the economic criteria related to Inputs, Outputs, Costs, and Benefits as they apply to Annual Cash Flow Analysis. D. Use Net Present Worth as a seed to find the equivalent annuity. E. Recognize the difference between EUAB and EUAC. F. Demonstrate an understanding of the purpose and use of methods for considering Equal Planning Horizons in making valid comparisons as it relates to Annual Cash Flow Analysis.	1
11.	Rate of Return A. Calculate the Internal Rate of Return of a single alternative. B. Use the Internal Rate of Return to determine feasibility of a single alternative. C. Calculate the Incremental Rate of Return of a single alternative. D. Use Incremental Rate of Return to compare two or more alternatives. E. Compare and contrast: Return versus Rate of Return. F. Recognize that frequency of use and general understanding of this technique. G. Identify potential problems associated with calculating the Internal Rate of Return.	1
12.	Other Analysis Techniques A. Use Future Worth analysis. B. Use Benefit-Cost Ratio. C. Use Sensitivity Analysis.	 1 1 1

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No.	Topic	CLO(s)
	D. Use Break-Even Analysis.	1
13.	Comparison of the Major Analysis Techniques A. Identify the strengths and weaknesses of the Net Present Worth evaluation technique. B. Identify the strengths and weaknesses of the Annual Cash Flow evaluation technique. C. Identify the strengths and weaknesses of the Incremental rate of Return evaluation technique.	
14.	Decisions Under Risk A. Construct a Decision Tree given a scenario. B. Calculate Expected Values for chance happenings. C. Perform an analysis by constructing a decision tree, calculating the expected values, and making a rational decision.	1
15.	Evaluations A. Interest and Equivalence. B. Annuities, Gradients, and Effective Interest. C. Net Present Worth and Annual cash Flow Analyses. D. Incremental Rate of Return Analysis. E. Other Analysis Techniques and Decision Trees.	
16.	Final Examination – Optional Comprehensive Final.	

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	John Kantorowski

Course: CONM 424 Construction Safety and Management

Credits: 3 Hours

Contacts: 3 Lectures

Course Description: Construction Safety and Management techniques used to manage people, resources and safety at the construction site. Safety topics, professional ethics, productivity, motivation, communication styles, leadership, time management and team building skills addressed.

Course Prerequisites: CONM 222, 225, 311; ENGL 311

Required Textbooks: "Construction Safety and the OSHA Standards", D. Goetsch (Chapters 1 thru 12)
"Management – A Focus on Leaders". A. McKee. (Chapters 1 thru 4)
"Making The Team" – Leigh Thompson. (Chapters 1 and 2)
"Engineering Ethics" – Charles Fleddermann. (Chapters 1, 3, and 5)

Required Materials: Safety Glasses

Course Learning Outcomes

1. Analyze the application of safety management in the construction industry
2. Prepare a construction safety plan (ACCE SLO #3)
3. Evaluate ethical conduct in construction situations (ACCE SLO #6)

Assessment Methods:

ACCE SLO #3 Create a construction project safety plan.
Assignment: Write a safety plan for a construction project.

ACCE SLO #6 Analyze professional decisions based on ethical principles.
Assignment: Describe the ethical implications of safety situations.

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Course Outline

No.	Unit Topic Description Summary	Lecture Hours	CLO(s)
1.	Introduction—Research and Presentation Criteria	1	
2.	Safety in the construction industry	22	2
3.	Professional Ethics	6	3
4.	Construction Management and Leadership	12	1
5.	Guest Speakers	1	2
6.	Evaluation	3	
	Total Hours	45	

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

	Topic	CLO(s)
1.	Introduction—Research and Presentation Criteria A. State the course objectives, procedures and grading policies B. Explain the presentation and the format of the research	
2.	Safety in the construction industry A. History of the Safety Movement B. Cost of Accidents C. Accident Investigation, record keeping and reporting D. Prepare a Construction Safety Plan E. OSHA compliance F. Jobsite hazards and potential risk G. Emergency Response Plan	1, 2
3.	Professional Ethics A. Professional Ethics B. Historical construction safety ethical dilemmas C. Discuss the connection between Ethics and Safety	3
4.	Construction Management and Leadership A. Leadership skills of a construction manager B. Communication skills C. Motivation factors	1

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	D. Productivity evaluation E. Methods for Team Building F. Connection between Leadership and Safety	
5.	Guest Speakers	
6.	Evaluation	

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Suzanne Miller

Course: CONM 460 Current Topics in Construction Management

Credits: 2 Hours

Contacts: 2 Lecture Hours per week

Course Description: The construction industry is continually evolving as our economics and our available technologies change. This dynamic course studies various contemporary problems, issues, or trends impacting the construction industry. Advances in technology, management efficiencies, and industry focus will be investigated. Topics addressed in this course change to reflect the most current issues facing the construction industry.

Course Prerequisites: CONM 225, 311, 312, 321, 324, 373; ENGL 311

Required Textbooks: Selected as appropriate for the semester's offered topic

Required Materials: As determined by the semester's offered topic

Course Learning Outcomes

Outcomes will be clearly defined for each topical course. Students will demonstrate that course outcomes have been met with the appropriately defined assessment criteria

1. Explain the significance of the current topic within the construction industry
2. Analyze any ethical conduct concerns with the current topic
3. Identify any unique methods or costs associated with this current topic

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours
1.	Introduction, Course Objectives, Course Assessment		1
2.	Current Industry Issues		23
3.	Guest Speaker/Field Trips		4
4.	Evaluation		2
	Total Hours		30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction A. Overview of Course Content B. Define Course Objectives C. Review Course Assessment	
2.	Current Industry Issues	
3.	Guest Speakers or Field Trips	
4.	Evaluations	

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Course Outline

Last Revision Date:	March 18, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	John Kantorowski

Course: CONM 461 Sustainability in Construction

Credits: 2 Hours

Contacts: 2 Lectures

Course Description: Study of sustainability utilized in the design and professional construction industry. Review sustainable energy, materials and water management methods. Examine "green" rating systems.

Course Prerequisites: CONM 225, 311, 312, 321, 324, 373; ENGL 311

Required Textbooks: (TBD)
Reference materials, mandatory supplemental reading, assignments, instructor messages and other information will be provided through Ferris Blackboard for this course.

Required Materials: Safety Glasses

Course Learning Outcomes

1). Understand and apply basic principles of sustainable construction (ACCE SLO #18)
2). Understand the different methods of rating sustainable building practices(ACCE SLO #18)

Assessment Methods:

ACCE SLO #18 Understand the basic principles of sustainable construction.
Test-Internal: Identify the various principles of sustainable construction and describe the different rating system methodologies

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Course Outline

No.	Unit Topic Description Summary	Lecture Hours	CLO's
1.	Introduction & Orientation	1	1, 2
2.	Sustainability Rating Systems	3	1, 2
3.	Sustainable Building Sites	3	1, 2
4.	Water Management	3	1, 2
5.	Sustainable Energy Sources and Energy Conservation Life Cycle Analysis	3	1, 2
6.	Sustainable Building Materials	2	1, 2
7.	Indoor Environmental Quality	3	1, 2
8.	Innovation In Design	1	1, 2
9.	Cost of Building Green	2	2
10.	Guest Speakers/Field Trips	3	
11.	Evaluations	3	
	Total Hours	30	

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

No.	Topic	CLOs
I.	Introduction A. Course syllabus and grading B. Assignment procedures	
2.	Rating Systems A. Different rating systems and their individual requirements B. Requirements in the LEED rating system C. Different methods to address existing buildings for sustainable improvements	1, 2
3.	Site and Building Management A. Site logistics to address sustainable building B. Special requirements for sustainable material handling and installation	1, 2
4.	Water Management A. Different methods for addressing water quality and conservation B. Importance of water conservation and scarcity trends	1, 2
5.	Types of Sustainable Renewable and Non-Renewable Energy Sources and Construction Conservation Methods A. Different sources for Sustainable energy B. How each system functions C. Selection energy sources depending upon the geographic location.	1, 2
6.	Sustainable Building Materials A. What constitutes a sustainable building material B. Different sustainable building materials and applications	1, 2
7.	Indoor Environmental Quality A. Characteristics of Indoor Environments B. Methods to make an indoor environment healthy	1, 2
8.	Innovation in Design A. Examples of accepted Innovative Design B. Possible Innovative Sustainable Designs	1, 2
9.	The Cost of Green Construction A. Value of LEED certification B. Why Owners want green C. Principles and effort to conduct a life cycle analysis for a building D. Risks and liabilities of building green	2.
10.	Field Trips/Guest Speakers A. Observe actual "Green" construction practices B. Discuss lessons learned	3

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 462 Power and Process Plant Construction

Credits: 2 Hours

Contacts: 2 Lecture Hours

Course Description: Study of the construction and basic engineering design of power generating plants and process plants. Review of major equipment and facility requirements with plant layout and arrangement. Emphasis on construction of power and process plants including materials and methods of construction with on-site management of the construction process.

Course Prerequisites: CONM 225, 311, 312, 321, 324, 373; ENGL 311

Required Textbooks: Greiman, Virginia A (2013). *Mega Project Management*. Ferris Book Store.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Course Learning Outcomes

1. Describe the characteristics and components for construction of large plant facilities.
2. Understand basic sources of energy and types of power generation and process plants.
3. Identify basic plant engineering principles.
4. Develop a large scale site plan and project management plan.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours
1.	Introduction and Orientation		1
2.	Basic Plant Engineering	3	2
3.	Sources of Energy	1	1
4.	Power Systems	1	2
5.	Conventional Power Plants	2	3
6.	Auxiliary Equipment	2	1
7.	Process Plants	2	3
8.	Process and Site Piping	1	3
9.	Foundations and Structural Systems	1	2
10.	Construction Erection	4	3
11.	Construction on-site management	4	3
12.	Evaluations		6
	Total Hours		30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Understand the relevance of the course material within the construction industry	
2.	Basic Plant Engineering A. Basic plant engineering principles B. Basic concepts of power transmission	3
3.	Sources of Energy A. Major types of fuels used in power plants B. Overall characteristics of the different major fuel types used	1
4	Power Systems A. Major types of power generation methods B. Size and scope for construction of the power generation methods	1
5	Conventional Power Plants A. Major equipment components of a conventional power plant B. Size and scope requirements for equipment installation	2
6	Auxiliary Equipment A. Different types of process piping used in power and process plants B. Different pipe joining systems used in power and process plants C. Requirements for installation and acceptance of welded pipe D. Function and type of major process valves	2
7	Process Plants A. Various types of industrial process plants B. Various types of municipal water and wastewater treatment plants	2
8	Process and Site Piping A. Materials of construction used in process and site piping B. Methods of construction for process and site piping C. Construction requirements for site coordination and inspection D. Pipe testing and acceptance procedures	1
9	Foundations and Structural Systems A. Scale of equipment foundation systems B. Construction requirements for foundations supporting dynamic equipment C. Concrete design and installation requirements for nuclear containment structures D. Major types of plant structural support systems	1

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Course Outline

No.	Topic	CLO(s)
10	Construction Erection A. Characteristics and importance of shop drawings in plant work B. Installation and acceptance requirements of process equipment C. Requirements of site logistics for all materials and equipment D. Type and locations of rigging equipment and construction cranes	4
11	Construction On-Site Management A. Typical delivery systems used in power and process plant construction B. Planning and implementation of plant commissioning C. Construction management requirements of site security D. Construction management requirements of site safety E. Impact of regulatory requirements on the construction process	4
12.	Evaluations	

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 463 Infrastructure Construction

Credits: 2 Hours

Contacts: 2Lectures

Course Description: Study of basic civil engineering design and on-site construction issues for construction projects. Use of construction documents and project planning methods. Study of engineering material systems with construction methods.

Course Prerequisites: CONM 225, 311, 312, 321, 324, 373; ENGL 311

Required Textbooks: To Be Determined

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Course Learning Outcomes

1. Understand basic civil engineering design and construction for construction infrastructure.
2. Review construction and design documents as part of construction planning.
3. Understand major materials and construction methods used in infrastructure construction.
4. Understand the basic elements of structural behavior in construction. (ACCE SLO #19)
5. Understand the basic principles of mechanical, electrical, piping and plumbing planning. (ACCE SLO #20)

Assessment Methods:

ACCE SLO #19 Understand the basic principles of structural behavior.
Test-Internal: Analyze structural behavior of infrastructure construction

ACCE SLO #20 Understand the basic principles of mechanical, electrical, and piping systems.
Test-Internal: Describe the main components of MEP systems

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Infrastructure	1	2	
3.	Construction Documents	2	4	
4.	Skyscrapers	1,3	3	
5.	Bridges	1,3,4	3	
6.	Tunnels	1,3	3	
7.	Airports	1,3	2	
8.	Dams and Reservoirs	1,3,5	2	
9.	Railways	1,3	1	
10.	Waterways, Canals, Ports and Harbors	1,3	2	
11.	Water Supply, Treatment and Distribution	1,5	3	
12.	Wastewater Collection, Treatment, and Disposal	1,5	2	
13.	Evaluations		2	
	Total Hours		30	0

Ferris State University
College of Engineering Technology

Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Infrastructure A. Major types of construction infrastructure B. Major construction issues by project type C. History of construction infrastructure through key projects	1
3.	Construction Documents A. Types of construction documents used in varying infrastructure projects B. Specifications and construction management documents C. Industry drawings	2
4	Skyscrapers A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3
5	Bridges A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3,4
6	Tunnels A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3
7	Airports A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3
8	Dams and Reservoirs A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria	1,3,5

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Course Outline

No.	Topic	CLO(s)
	C. Historical construction methods D. Construction management and planning issues	
9	Railways A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3
10	Water Supply Treatment and Distribution A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,5
11	Wastewater Collection, Treatment and Disposal A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,5
12	Waterways, Canals, Ports and Harbors A. Basic civil engineering design criteria and requirements B. Major construction materials used with quality and installation criteria C. Historical construction methods D. Construction management and planning issues	1,3
13	Evaluations	
14	Final Examination – Comprehensive Exam (SLO # 19 Direct assessment)	

Ferris State University
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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: CONM 499 Construction Project Management

Credits: 3 Hours

Contacts: 2 Lecture Hours per Week, 2 Lab hours per Week

Course Description: The Construction Management program capstone course leading to the award of an ACCE accredited Bachelor of Science degree in Construction Management. Students explore the roles and tasks of the professional construction manager. Student work is intended to be applied in a holistic manner using all previously developed construction program coursework. Project management issues within a decision making and problem solving context are included in a semester-long simulation of an actual construction project in a student team environment. Assessment of the student team projects include a professional presentation to industry standards conducted by a team of faculty and several construction industry representatives.

Course Prerequisites: CONM 311, 312, 321, 324, 373, 413, 424; ENGL 311

Required Textbooks: “Professional Construction Management” by Barrie & Paulson, McGraw-Hill, ISBN 0-07-003889-9

Required Materials: Calculator with exponential functions

Engineering and Architectural Scales
Plans and Specifications for one of the Program’s designated projects (which are updated periodically)

Course Learning Outcomes

1. Understand the concepts of project management in the construction industry. (ACCE SLO # 7, # 12)
2. Integrate technical, business, and ethical concerns in a project environment. (ACCE SLO # 6, # 13)
3. Create professional construction management submittals from construction project documents. (ACCE SLO #3, #4, #5, #9, #15, #16)
4. Successfully present student team work to faculty and industry representatives. (ACCE SLO #1, #2, #9)

Assessment Methods:

ACCE SLO #1 Create written communication appropriate to the construction discipline.
Written Product: Create technical memoranda on student team project.

ACCE SLO #2 Create oral presentations appropriate to the construction discipline.
Presentation (oral): Team assessment of communication skills during team project presentation.

ACCE SLO #3 Create a construction project safety plan.
Assignment: Write a portion of a project safety plan for a construction project.

ACCE SLO #4 Create construction project cost estimates.
Assignment: Prepare a project cost estimate as part of a student team.

ACCE SLO #5 Create construction project schedules.
Assignment: Prepare a project schedule as part of a student team.

ACCE SLO #6 Analyze professional decisions based on ethical principles.
Test - Internal: Evaluate construction industry case studies.

ACCE SLO #7 Analyze construction documents for planning and management of construction processes.
Assignment: Analyze project contract documents to prepare team submittals.

ACCE SLO #9 Apply construction management skill as a member of a multi-disciplinary team.
Assignment: Write an evaluation of each team member for a teamwork activity.

ACCE SO #12 Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
Test-Internal: Identify roles, responsibilities, and relationships of project delivery methods.

ACCE SLO #13 Understand construction risk management.
Test-Internal: Explain/identify basic elements of risk analysis.

ACCE SLO #15 Understand construction quality assurance and control.
Assignment: Write a project QS/QC plan as part of the student team project.

ACCE SLO #16 Understand construction project control processes.
Test-Internal; Identify project control techniques.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Industry Today	1	5	
3.	Construction Organization and Delivery Systems	3	8	
4.	Professional Construction Management	1,2	8	
5.	Project Management Issues and Techniques	1,2	8	
6.	Semester Team Project	3,4		15
7.	Faculty and Industry Assessment of Student Team Project	3,5		6
8.	Evaluations			6
9.	Guest Speakers			3
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment C. Schedule and criteria of project team submittals	
2.	Construction industry Today A. Roles, responsibilities and authority or project participants B. Value of teamwork in construction C. Evaluate the effects of project leadership D. Review historical trends in construction management E. Project future conditions in the construction industry	1
3.	Construction Organization and Delivery Systems A. Management structures in the construction industry B. Attributes of construction delivery systems C. Select and justify a delivery system for a type of construction project D. Compare and contrast construction management roles by delivery system	3

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Course Outline

4.	Construction Management A. Basic construction planning requirements B. Interactions of the cost/time/quality constraints in project management C. Site management for a construction project D. Assess business management for a construction project E. Appraise the role of ethics in the construction industry	1,2
5.	Project Management Issues and Techniques A. Assess the difficulty of incorporating goals and objectives into a project management plan B. Apply time and stress management skills C. Demonstrate the requirements of professional conduct D. Exercise the delivery of professional communication skills E. Evaluate historical project management challenges in the construction industry	1,2
6.	Semester Team Project A. Create a team based project bid document B. Create a team based project estimate C. Create a team based project schedule D. Create a team based project safety plan E. Create a team based project site management plan F. Create a team based project quality assurance/quality control plan G. Create a team based project environmental plan H. Create a team based project submittal and shop drawing log	3,4
7.	Faculty and Industry Assessment of Team Projects	3,5
8.	Evaluations	
9.	Final Examination – Comprehensive Exam	

Course Syllabus – CONM 100

Ferris State University - College of Engineering Technology

Course: CONM 100 Orientation to Construction Technology and Management

Credits: 1 Hour
Contacts: 1 Hour Lecture
Course Description: The purpose of this course is to provide first year construction students with personal connections, knowledge and resources that will enhance their potential for learning, safety, satisfaction and graduation. The goal is to facilitate student's transition from high school to university life and thus improve each student's academic performance and retention. This course will serve as an internal model for interactions with program professors.
Course Prerequisites/ Requirements: BCTM, CETM, Pre-BCTM, Pre-CETM Students

Student Learning Outcomes

Upon completion of this course the student will be able to:

1) Become familiar with campus resources and technology (academic, student, and personal support services);
2) Develop an awareness of teaching / learning styles and how to use a variety of study strategies to adapt in various learning environments;
3) Gain an understanding of wellness issues that directly affect their health and safety;
4) Learn to develop effective time management and goal setting strategies;
5) Learn to understand, respect, and value diversity in its many forms;
6) Learn about academic advisor/advisee relationships and course registration;
7) Become active participants and contributors in the campus and community;
8) Learn about and understand academic integrity and classroom etiquette skills that foster appropriate conduct in a post-secondary institutional setting;
9) Be introduced to financial literacy;
10) Learn about the University's mission, core values, and historical development.

Instructional Unit Topic Descriptions and Time Allocations

	UNIT DESCRIPTION	TIME Lecture
I.	Course Introduction, Goals, Policies and Classroom Etiquette	1
II.	Learning Styles	1
III.	Wellness - Alcohol Use and Abuse Wellness - Choice and Responsibility	1

Course Syllabus – CONM 100

Ferris State University - College of Engineering Technology

IV.	Campus Resources	1
V.	Time Management	1
VI.	Study Skills	1
VII.	Academic Integrity - Paper Criteria	1
VIII.	Advising and registration	1
IX.	The Construction Industry in the USA	2
XI	Ferris' Construction Programs	1
XI.	Diversity	1
XII.	History of Ferris State University and W.N. Ferris	1
XII.	Evaluation Day	1
XIV.	Holidays	1
	Total Lecture Hours	15

Learning Outcomes for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily:

I	Course Introduction, Goals, Policies and Classroom Etiquette A. Describe the course syllabus, procedures and grading. B. Complete the Classroom Etiquette Handout
II	Time Management A. Complete the Time Management Profiles B. Complete the Procrastination Quotient Instrument C. Describe strategies to reduce procrastination and improve time management
III	Wellness - Choice and Responsibility A. Attend Alcohol Awareness, Sexual Assault Presentations B. Watch the Choices Video and Write a brief summary of the highlights
IV	Wellness - Alcohol Use and Abuse A. Complete the BART Instrument B. Complete the Wellness Instrument
V	Learning Styles
VI	Study Skills Complete the Study Skills Instrument
VII	Campus Resources A. Find the Student Academic Support Center and obtain stamp.

	B. Find the Library and find certain construction reference books and resources
VIII	Advising and registration A. Meet with your Advisor. B. Complete the Scheduling Assignment
IX	Academic Integrity - Paper Criteria A. Define Plagiarism B. Provide some examples of Plagiarism C. Describe the Strength and Weakness Paper Criteria
X	The Construction Industry in the USA A. Describe the positions that are available in the construction industry B. Compare the various business structures of the construction industry
XI	Ferris' Construction Programs A. Draw a logic network showing the prerequisites for the construction courses B. List the various prerequisites for the program and the university
XII	Diversity A. Identify diversity issues at Ferris
XIII	History of Ferris State University and W.N. Ferris A. Describe the mission of Woodbridge N. Ferris as an educator and statesman. B. Define the uniqueness of Ferris State University and its academic programs
XIV	Evaluation Day A. Complete the FSU Seminar course evaluations B. Complete the Scientific Understanding and the Social Awareness Assessments.
XV	Academic Success A. Identify the skills necessary to become a successful student B. Describe the strategies that you will implement to become a successful student C. Complete the stress profile D. Identify some coping techniques for dealing with stress and conflict

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Course Outline

Last Revision Date:	January 29, 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Ferrell Clark

Course: BCTM 213 Wood and Steel Framing and Finishes

Credits: 3 Hours

Contacts: 3 Lectures

Course Description: The study of framing and finish techniques and materials used in wood and light steel construction. Basic layout and fabrication of wood and steel beams, joists, studs, rafters and stairs. Construction math principles are emphasized.

Course Prerequisites: CONM 111, 112, 116; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+

Suggested Textbooks: Carpentry, 4th Edition, Leonard Koel

Required Materials: All PPE (hard hat, safety glasses, long pants and shirt, work boots/shoes and hearing protection), Pencils, Calculator, Claw Hammer, Tool Belt, Tape Measure.

Course Learning Outcomes

1. Complete the layout, assembly, and construction of a 2-story structure comprised of wood and metal framing members.
2. Understand carpentry skills and methods utilized in the construction industry. (ACCE SLO#8)
3. Apply principles of construction mathematics.

Method of Assessment:

ACCE SLO #8 Analyze methods, materials, and equipment used to construction a project.
Test-Internal: Demonstrate carpentry skills and methods.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction		1	1
2.	Personal & Lab Safety		2	3
3.	Construction Materials (wood)	1	2	1
4.	Floor and Wall Framing	1, 3	3	9
5.	Stairway Design and Layout	1, 3	4	6
6.	Metal stud Material	1	1	6
7.	Roof Framing	3	6	12
8.	Roof Types and Materials	2	2	2
9.	Windows and Doors	2	2	2
10.	Exterior Finishes	3	2	0
11.	Interior Finishes	2	1	0
12.	Daily Preplanning	2	1	0
13.	Evaluations		3	3
	Total Hours		30	45

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Course Outline

Topics for Each Instructional Unit

	Upon Completion of each instructional unit, the learner will be able to satisfactorily:
I & II	Introduction & Personal & Lab Safety Procedures A. Explain the course goals, attendance and grading polices. B. Explain the Lab Safety rules, tool and equipment operation, and safe work practices C. Practice delivering safety talks to crews
III.	Wood Construction Materials A. Read lumber grades B. Calculate loads on framing members using span tables
IV.	Floor and Wall Framing A. Demonstrate how to layout floors and walls B. Calculate materials for floor and walls C. Prepare cut list and pricing list
V.	Stairway Design and Layout A. Calculate riser's heights and tread lengths. B. Layout stringers cut and assemble. C. Install stringer, treads, and risers in structure.
VI.	Roof Framing A. Layout Common, Hip, and Jack rafters B. Order materials for roof system C. Install components of roof system.
VII.	Roof Types and Materials A. Become familiar with the types of roofing systems B. Calculate roofing material order
VIII	Windows and Doors A. Define dimensioning requirements for rough openings B. Use a manufacturers window schedule to order materials
VIII.	Exterior Finishes A. Explain how to order and install wood and manufactured sidings B. Recognize the different types of cornice and understand how they are constructed
IX	Interior Finishes A. Be familiar with different types of insulation products, surfaces, and drywall
X	Daily Preplanning A. Exercise the process of ordering materials the next class B. Plan the expected outcomes of the work in the lab.
XI.	Evaluations

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Course Outline

Last Revision Date:	September 17, 2015
Program Coordinator:	Suzanne Miller
Drafted By:	Suzanne Miller

Course: BCTM 217 Virtual Design and Construction

Credits: 3 Hours

Contacts: 2 Lecture Hours and 2 Lab Hours per week

Course Description: Utilizing the emerging computing and information technologies used in the solution of construction problems and in construction management, this course will expose students to the creation and integration of virtual models used in design, construction, estimating, scheduling, and facility management.

Course Prerequisites: CONM 112, 116, CONM 117, CONM 211

Course Co-Requisites: CONM 222

Required Textbooks: Textbook on virtual design and construction software– updated as software is updated

The 5th Dimension – BIM Estimating , 1st Edition, Todd A. Baxter

Required Materials: Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Acquire knowledge and skills to generate and modify Building Information Technology models of MEP (Mechanical, Electrical, Plumbing) systems. (ACCE SLO#10)
2. Demonstrate how to combine 3D geometry from cross disciplines into one scene to enable effective model reviews. (ACCE SLO#10)
3. Create and modify basic Building Information Technology models of Civil, Architecture, Structure, and MEP (Mechanical, Electrical, Plumbing) to extract specific information in multiple dimensions. (ACCE SLO#10)
4. Document and animate models and their extracted information (ACCE SLO#1)

Assessment Methods:

SLO #1 Create written communication appropriate to the construction discipline:

Assignment - create a model for presentation and document the extracted information.

SLO #10 Apply electronic-based technology to manage the construction process:

Assignment- Use BIM models of a building and site to extract information.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Building information technology models of MEP	1	4	4
2.	Virtual model interference detection	2	6	6
3.	4D Virtual modeling	3	5	5
4.	5D Virtual modeling	3	4	4
5.	Virtual models in facility management	3	4	4
6.	Virtual model animation, documentation, and communication	4	4	4
7.	Evaluation		1	1
8.	Holiday		1	1
	Total Hours		30	30

Topics for Each Instructional Unit

Upon completion of each instructional unit, the learner will be able to satisfactorily complete:

No.	Topic	CLO(s)
1.	Virtual model interference detection A. Views B. File setup C. Manipulate files D. Work sets, searches, filters and reports	
2.	4D Virtual modeling A. Information entry B. Phasing C. Simulations D. Animate models	
3.	5D Virtual Modeling A. Information entry B. Manipulate model C. Create an estimate	
4.	Virtual modeling in facility management A. Explain the value of BIM for facility management	

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Course Outline

No.	Topic	CLO(s)
	B. Integration C. Life cycle capture	
5.	Virtual model documentation and communication A. Review and markup models B. Animate models C. Update reports D. VDC execution plan E. Jobsite meetings vs. web meetings	

Minimum Required Student Laboratory Activities

No.	Topic	CLO(s)
1.	Virtual model interference detection A. Views B. File setup C. Manipulate files D. Create work sets, searches, filters and reports E. Identify issues	
2.	4D Virtual models A. Information entry B. Phasing C. Simulations D. Animate models	
3.	5D Virtual models A. Information entry B. Manipulate a model to extract the proper parametric properties C. Create an estimate	
4.	Virtual models in facility management A. Value of BIM for facility management B. Integration of BIM into facility management C. Life cycle capture	
5.	Virtual model documentation and communication A. Review and markup models B. Animate models C. Updating reports D. BIM execution plan E. Jobsite meetings vs. web meetings	

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Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna, John Kantorowski

Course: BCTM 234 Electrical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for electrical service and distribution, fire protection, building security and signaling, and building automation systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of electrical trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117;

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Assessment Method:

SLO #20 Understand the basic principles of mechanical, electrical, and piping systems.
Test-Internal: Explain the basic principles of construction electrical systems

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues	1

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Course Outline

No.	Topic	CLO(s)
	C. Code requirements D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

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Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: BCTM 235 Mechanical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for plumbing, piping, fire suppression and mechanical systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of mechanical and piping trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117; C- or higher in MATH 120/126 or math ACT 26+/SAT 610+

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Assessment Methods:

SLO #20 Understand the basic principles of mechanical, electrical, and piping systems:
Test, Internal - Explain basic principles of electrical systems on the construction site

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues C. Code requirements	1

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Course Outline

No.	Topic	CLO(s)
	D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

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Course Outline

Last Revision Date:	August 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Kelly Seitter

Course: **CETM 214** **Advanced Materials Properties and Testing**

Credits: 3 Hours

Contacts: 2 Lecture, 2 Lab Hours per Week

Course Prerequisites: CONM 121; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Course Description: An advanced course in the application of aggregate characteristics, specifications, and testing and the design, analysis and application of hot mix asphalt and concrete. Michigan Department of Transportation specifications, testing procedures, and technician certification programs are emphasized.

Required Textbooks: Asphalt Handbook, by The Asphalt Institute
Superpave Mix Design Handbook by Asphalt Institute

Reference Materials: An Introduction to Aggregate Testing booklet by ICET
MDOT Michigan Certified Aggregate Technician Manual
MDOT Density Control Manual
MDOT Certified Bituminous Laboratory Manual

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

1. Test, identify, analyze and blend materials for a HMA trial batch designed to meet Superpave specifications. (ACCE SLO#8)
2. Compute HMA Volumetric Properties for proposed mix designs, test HMA trial batches, and compare test results to Superpave criteria. (ACCE SLO#15)
3. Test, identify, analyze, and combine materials to prepare a concrete mix design. (ACCE SLO#8, ACCE SLO#15)

Assessment Methods:

ACCE SLO #8 Analyze construction documents for planning and management of construction processes.
Test - Internal: Calculate FAA aggregate proportions

ACCE SLO #15 Understand construction quality assurance and control.
Assignment: Generate lab reports for appropriate tests conducted during labs.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
I.	Introduction, procedures, lab safety policy		1	
II.	Hot Mix Asphalt definitions		2	
III.	HMA aggregate gradations and Superpave specifications	1	4	3
IV.	HMA aggregate blending and trial batching	1	2	3
V.	Superpave mix design criteria and volumetric properties	2	4	9
VI.	HMA Theoretical Maximum Density, Bulk Specific Gravity	2	2	4
VII.	Super Gyratory Compactor	2	2	4
VIII.	Superpave Binder Specifications	4	2	
IX.	Concrete Pavement Current Industry Practices	3	8	7
X.	Evaluations		3	
	Total Hours		30	30.0

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
I.	Introduction, procedures, lab safety policy A. Discuss course objectives B. Explain assignment procedures C. Employ lab safety procedures	
II.	Hot Mix Asphalt Definitions and Acronyms A. Define and use HMA acronyms B. Identify and use HMA terminology	1
III.	HMA Aggregate Gradations and Superpave Specifications A. Plot the aggregate gradation limits on the FHWA .45 power chart B. Plot the maximum density on the FHWA .45 power chart C. Plot the optimum gradation on the FHWA .45 power chart	1,2
IV.	HMA Aggregate Blending and Trial Batching A. Identify the purpose of aggregate blending B. Compute blending proportions from four different aggregates C. Plot blend proportions on the FHWA .45 power graph D. Compute combined specific gravity of aggregates	1
V.	Superpave Mix Design Criteria and Volumetrics A. Identify the performance objectives and applications of superpave mix designs B. Compute volumetric properties of trial mix designs including air voids, Gmm, Gmb, percent binder absorbed and effective binder content	2
VI.	HMA Theoretical Maximum Density (TMD) and Bulk Specific Gravity (Gmb) A. Identify the significance of the TMD and Gmb as they relate to HMA mix design objectives B. Compute the TMD and Gmb of the HMA trial batch C. Compare TMD and Gmb results to meet design criteria	2

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Course Outline

VII.	Super Gyratory Compactor A. Identify the purpose of the super gyratory compactor as it relates to the HMA compaction process during production and placement B. Describe HMA compaction quality control issues C. Calculate the HMA volumes at Nmax, Ndesign, Ninitial
VIII.	Binder Properties and Testing A. Identify binder properties B. Describe penetration grades and viscosity grades C. Explain the advantages and disadvantages of binder testing methods
IX.	Superpave Binder Specifications A. Identify performance graded binder specifications B. Perform performance graded binder testing C. Explain the application of Performance Grade binder grades to meet Superpave criteria
X.	Concrete Pavement Joint Layout A. Describe the material stresses in joint load transfer B. Perform joint layout exercises C. Understand considerations in joint location
XI.	Concrete Pavement Current Industry Practices A. Describe current Industry practices in concrete paving and materials B. Identify current practices in aggregate gradation C. Evaluate supplementary cementitious materials D. Evaluate admixtures E. Identify durability solutions for concrete pavements F. Understand considerations in joint location G. Create a mix design
XIII.	HMA Performance Problems A. Describe industry-wide pavement performance problems B. Explain causes of pavement performance problems C. Identify solutions for pavement performance problems
	Final Examination

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Course Outline

Minimum Required Student Laboratory Activities

I.	Aggregate Gradation A. Conduct a sieve analysis test for HMA aggregates B. Compute aggregate gradation proportions C. Verify compliance with superpave specifications
II.	Fine Aggregate Angularity A. Conduct a FAA test for HMA aggregates B. Compute FAA aggregate proportions C. Verify compliance with superpave specifications
III.	Coarse Aggregate Angularity A. Conduct a FAA test for HMA aggregates B. Compute FAA aggregate proportions C. Verify compliance with superpave specifications
IV.	Flat and Elongated (F&E) Aggregate A. Conduct F&E test B. Compute F&E aggregate proportions C. Verify compliance with superpave specifications
V.	Fine aggregate specific gravity A. Conduct a fine aggregate specific gravity test B. Compute the fine aggregate specific gravity
VI.	Coarse aggregate specific gravity A. Conduct a coarse aggregate specific gravity test B. Compute the coarse aggregate specific gravity
VII.	Aggregate blending A. Compute aggregate blending proportions B. Plot aggregate proportions on mix design control chart C. Determine compliance with superpave specifications
VIII.	Superpave Trial batching A. Measure aggregate proportions B. Compute binder amount C. Mix trial batch aggregate and binder
IX.	Super Gyratory Compaction A. Prepare trial batch for compaction B. Compact trial batch C. Compare compaction gyrations to superpave specifications

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Course Outline

Minimum Required Student Laboratory Activities

X.	HMA Bulk Specific Gravity A. Conduct a bulk specific gravity on a trial batch B. Compute the bulk specific gravity of trial batch C. Determine conformance of trial batch Gmb to specifications
XI.	HMA Theoretical Maximum Specific Gravity (TMD) A. Conduct a TMD test on trial batch B. Compute the TMD of the mix C. Compare the TMD results to typical values
XII.	Vacuum extraction binder content A. Perform binder vacuum extraction test on trial batch B. Compute binder content of trial batch C. Calculate aggregate gradation of trial batch D. Compare test results to specifications
XIII.	Ignition furnace binder content A. Perform ignition furnace binder extraction test on trial batch B. Compute binder content of trial batch C. Calculate aggregate gradation of trial batch D. Compare test results to specifications
IV.	Concrete Current Industry Practices A. Conduct a concrete mix design and batching utilizing optimized aggregate gradation B. Conduct a concrete mix design and batching using supplementary cementitious materials. C. Compare test results to specifications.

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Course Outline

Last Revision Date:	October 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Kelly Seitter

Course: CETM 215 Construction Equipment and Operations

Credits: 3 Hours

Contacts: 3 Lecture, 0 Lab Hours per Week

Course Description: Fundamentals of construction equipment ownership and operation. Topics include ownership and operating costs, earthwork fundamentals, productivity rates for construction equipment.

Course Prerequisites: CONM 121; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Peurifoy, Schexnayder and Shapira - *Construction Planning, Equipment, and Methods*. Current Edition. McGraw-Hill: NY.

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate:

1. Determine ownership and operating costs of construction equipment. (ACCE SLO #4)
2. Understand basics of equipment operation and efficiency (ACCE SLO #8)
3. Determine production rates for equipment commonly used on highway and bridge construction. (ACCE SLO #8)
4. Calculate bid prices based on equipment productivity

Assessment Methods:

ACCE SLO #4 Create construction project cost estimates.
Assignment: Determine ownership and operation cost of construction equipment.

ACCE SLO #8 Analyze methods, materials, and equipment used to construction a project.
Assignment: Select the appropriate equipment based on calculated production rates.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
I.	Introduction		1	0
II.	Contract Administration, field diaries, and record keeping		3	0
III.	Owning and Operating Costs	1	2	0
IV.	Construction Specifications		1	0
V.	Earthwork Fundamentals	2	4	0
VI.	Earthmoving Fundamentals		4	0
VII.	Mobile Equipment Power Requirements	2	3	0
VIII.	Dozer use & productivity	2, 3, 4	2	0
IX.	Scraper use & productivity	2, 3, 4	2	0
X.	Grader use & productivity	2, 3, 4	2	0
XI.	Compactors and Finishing Equipment		2	0
XII.	Excavator and Loader use & productivity		2	0
XIII.	Hauling Equipment use & productivity		2	0
XIV.	Cranes		2	0
XV.	Hot-mix Asphalt Pavement Equipment Construction	2, 3	4	0
XVI.	Bridge and Structure Construction		2	0
XVII.	Construction Staking		3	0
XVIII.	Examinations		4	0
	Total Hours		45	0

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
I.	Introduction A. Discuss the course objectives B. Explain the grading and attendance procedures.	
II.	Contract Administration, field diaries, and record keeping A. Explain the types of contracts and the Contractor's risk involved B. Describe the Contractor's financial considerations. C. Discuss the evaluation necessary to economically match machine capability to the project. D. Identify the equipment production, equipment cost and field construction records needed.	
III.	Owning and Operating Costs. A. Determine equipment operating costs. B. Calculate the Ownership cost. C. Compute the maintenance costs.	1
IV.	Construction Specifications A. Discuss construction specifications and how they affect the finished produce B. Discuss how specifications affect the construction process	
V.	Earthwork Fundamentals A. Discuss the soil volume changes and the factors to apply B. Calculate the earthwork quantities using the Mass Diagram method. C. Compute the Haul distance	2
VI.	Earthmoving Fundamentals A. Identify the process involved in roadway earthwork and drainage excavation	
VII.	Mobile Equipment Power Requirements A. Identify the equipment resistance factors and effective work effort available B. Utilize grade and resistance to estimate productive capacity of equipment. C. Utilize the drawbar pull and the rimpull to estimate productive capacity of equipment	2
VIII.	Dozer use & productivity A. Describe the types of dozers and methods to optimize performance. B. Interpret the dozer performance charts. C. Calculate the dozer production rates under varied job conditions.	2, 3, 4
IX.	Scraper use & productivity A. Describe the types of scrapers and methods to optimize performance. B. Interpret the scraper performance charts. C. Calculate the scraper production rates under varied job conditions.	2, 3, 4

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Course Outline

No.	Topic	CLO(s)
X	Grader use & productivity A. Describe the grader operation methods. B. Calculate the grader production rate under specific conditions. C. Define the grading terms.	2, 3, 4
XI..	Compactors and Finishing Equipment A. Explain finish grading methodology B. Calculate rates for associated equipment	
XII.	Excavator and Loader use & productivity A. Describe the types of excavators and loaders. B. Interpret the excavator and loader performance charts. C. Calculate the excavator and loader production rates.	
XIII.	Hauling Equipment use & productivity A. Describe the types of trucks. B. Interpret the truck performance chart. C. Calculate the truck production rates. D. Compute the number of trucks in relationship to the backhoe production rate.	
XIV.	Cranes A. Identify types of cranes and best condition each is suited for. B. Recognize typical safety risks associated with crane operations.	
XV.	Hot-mix Asphalt (HMA) Pavement Equipment Construction A. Describe the asphalt surface preparation methods. B. Explain the HMA delivery methods. C. Identify the HMA paving equipment. D. Calculate the HMA compaction equipment production rate.	2, 3
XVI.	Bridge and Structure Construction A. Examine the process of structure construction..	
XVII.	Construction Staking A. Describe the construction staking methods for earthwork and paving courses. B. Calculate staking cut and fill computations.	

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Course Outline

Last Revision Date:	August 2016
Program Coordinator:	Suzanne Miller
Drafted By:	Kelly Seitter

Course: CETM 226 Highway Technology

Credits: 3 Hours

Contacts: 2 Lecture, 2 Lab Hours per Week

Course Description: Basic techniques and procedures of highway design and pavement structural analysis. Planning processes for highway projects. Plan development utilizing current industry standard software emphasized.

Course Prerequisites: CONM 112, 117, 122; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+

Required Textbooks: Traffic & Highway Engineering, Third Edition, by N. Garber and L. Hoel - Brooks/Cole Publishing – ISBN 0-534-38743-8

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate:

1.) Describe the planning and design processes for highways.
2.) Calculate the geometric design elements of roadways.
3.) Demonstrate the methods utilized by AASHTO for structural pavement design. (ACCE SLO #19)
4.) Design geometric elements and draw road plan elements utilizing current industry standard software. (ACCE SLO#10)

Assessment Methods:

ACCE SLO #19 Understand the basic principles of structural behavior.
Project: Determine the appropriate pavement structure given certain traffic loads.

ACCE SLO #10 Apply electronic-based technology to manage the construction process.
Assignment: Design a sag vertical curve with associated geometric elements.

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Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
I.	Introduction		1	0
II.	Planning process	1	2	2
III.	Highway functional classification		1	2
IV.	Highway and traffic characteristics		2	2
V.	Design process	3	2	1
VI.	Typical Sections		2	4
VII.	Geometric Design	4	4	4
VIII.	Environmental coordination	1	1	1
IX.	Right-of-Way		1	1
X.	Quantity computations and specifications	2	1	4
XI.	Pavement design criteria	3	1	2
XII.	Flexible (asphalt) pavement design	3, 4	2	1
XIII.	Rigid (concrete) pavement design	3, 4	2	1
XIV.	Pavement preventive maintenance and rehabilitation		3	1
XV.	Plan development utilizing industry software.	4	2	4
	Examinations		3	0
	Total Hours		30	30

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

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Course Outline

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
I.	Introduction. A. Review course goals. B. Review course policies.	
II.	Planning Process. A. Discuss planning, design, and construction process for roadways B. Differentiate survey requirements for roadway design. C. Budget constraints.	1
III.	Highway Functional Classification. A. Compare Primary and secondary routes. B. Interpret Arterial, Collector, and Local routes.	
IV.	Highway and traffic characteristics. A. Summarize Design vehicles. B. Explain Capacity. C. Explain Level of service. D. Compute Traffic analysis.	
V.	Design process. A. Generalize utility coordination. B. Discuss public involvement. C. Contrast project types – reconstruct and 3R.	
VI.	Typical Sections and Plan Visualization. A. Explain typical plan sequence B. Recognize Typical Sections. C. Recognize Plan views. D. Recognize Profile views. E. Recognize Cross Sections	
VII.	Geometric Design. A. Analyze Clear Zone and roadside design. B. Identify typical geometric elements and dimensions. C. Compute Stopping sight distance. D. Compute Passing sight distance. E. Compute Decision and intersection sight distance. F. Determine Crest and sag vertical curves.	4

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Course Outline

No.	Topic	CLO(s)
	G. Compute Superelevation. H. Evaluate Horizontal curves.	
VIII.	Environmental Coordination A. Explain Environmental clearances. B. Explain typical environmental impacts of varied project types.	1
IX.	Right-of-Way A. Differentiate Right-of-Way needs. B. Compare varied types of Right-of-Way acquisitions.	
X.	Quantity computations and specifications. A. Differentiate varied units of measure. B. Calculate Quantity computations. C. Compare Specifications and Special Provisions.	2
XI.	Pavement design criteria A. Evaluate Pavement design criteria. B. Utilize Traffic projections. C. Explain Equivalent Single Axle Loads. D. Examine factors relating to pavement design criteria	3
XII.	Flexible (asphalt) pavement design A. Prepare asphalt pavement design	3, 4
XIII.	Rigid (concrete) pavement design A. Prepare concrete pavement design	3, 4
XIV.	Pavement preventive maintenance and rehabilitation. A. Differentiate rehabilitation methods for rigid and flexible pavements. B. Explain preventive maintenance methods for pavements.	
XV.	Plan development utilizing industry software. A. Develop plan views showing roadway components.	4

Minimum Required Student Laboratory Activities

I.	Planning process for roadways: A. Determine proper procedures for planning process.
II.	Quantity Computations: A. Compute quantities of pavement, aggregates, and subbase for a roadway section.
III.	Geometric Standards – Reference AASHTO Green Book : A. Calculate Stopping Sight Distance, Passing Sight Distance, and Decision Sight Distance. B. Calculate intersection sight distance, horizontal curve sight distance C. Calculate crest and sag vertical curves. D. Identify typical roadway cross section widths and slopes. E. Identify points on the roadway using the terminology of the industry. F. Compute and identify superelevation transition through a curve.
III.	Industry Approved Drafting Software A. Perform basic functions of the software to electronically draw varied representations of highway plan sheets and typical sections.
IV.	Project: A. Students will individually complete a project that will encompass the entire roadway design process. Evaluate the existing profile according to current design standards. B. Evaluate existing and design proposed typical sections. C. Designing a recommended profile. D. Compute proposed profile elevations. E. Evaluate the existing pavement structure and recommend a proposed pavement design. F. Design proposed cross-sections G. Compute quantities including earthwork. H. Determine right-of-way requirements for the proposed project. I. Use industry approved software to prepare drawings.

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Course Outline

Last Revision Date:	December 2016
Program Coordinator:	Suzanne Miller
Drafted by:	Bob Eastley

Course: CETM 227 Hydraulics and Hydrology

Credits: 3 Hours

Contacts: 3 Lecture Hours per Week, 0 Lab Hours per Week

Course Description: The study of fluid mechanics, hydrostatics, open channel flow, pipe flow, pumping, flow measurements, and flow through hydraulic structures, and the principles of hydrology including precipitation, statistical methods and runoff.

Course Prerequisites: MATH 120/126 (grade of C- or better) or higher MATH; PHYS 211

Required Textbooks: *Introduction to Hydraulics and Hydrology* by Gribbin

Required Materials: None

Course Learning Outcomes

Students satisfactorily completing this course will achieve/complete/demonstrate…:

1. Calculate hydrostatic pressures and resultant vector forces and their locations on submerged surfaces.
2. Perform hydrodynamic calculations on fluids in open and closed conduits (ACCE SLO #20).
3. Perform hydrologic calculations on a watershed.
4. Understand hydraulic methods of storm water control.

Assessment Methods:

ACCE SLO #20 Understand the basic principles of mechanical, electrical, and piping systems.
Test-Internal: Perform hydrodynamic calculations on fluids in open and closed conduits.

Page **1** of **3**

Instructional Unit Topic Descriptions and Time Allocations

NO.	UNIT TOPIC DESCRIPTION SUMMARY	CLO	LECTURE HOURS
1	Introduction		1
2	Fluids at rest, hydrostatics	1	7
3	Principles of buoyancy and buoyant forces	1	2
4	Flow of liquids in closed conduits	2	8
5	Principles of hydrology	3	10
6	Storm sewer and detention design	2,4	4
7	Open channel flow	2	2
8	Flow measurement in open channels	2	3
9	Flow measurement in closed conduits	2	2
10	Culvert analysis	3,4	3
11	Examinations		3
	Total Hours		45

* Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Learning Outcomes for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

1	Introduction A. Identify course requirements B. Describe grading and conduct policies
2	Fluids at rest, hydrostatics A. Analyze pressures in gases B. Determine the magnitude and location of hydrostatic forces. C. Calculate fluid pressures in pressure measuring devices D. Calculate forces on submerged planes and curved surfaces F. Calculate absolute and gage pressures

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Course Outline

3	Principles of buoyancy and buoyant forces A. Calculate differential pressure on submerged objects B. Calculate magnitude and line of action of resultant force
4	Flow of liquids in closed conduits A. Apply Bernoulli's energy equation B. Calculate major and minor energy losses C. Calculate Reynolds number and predicted energy loss in pipes D. Determine pump horsepower requirements
5	Principles of hydrology A. Calculate inflow and outflow. B. Utilize statistical methods and calculate probability of a storm C. Determine volume of precipitation from a predicted storm D. Calculate predicted runoff from a watershed
6	Storm sewer and detention design A. Determine inflow into a storm sewer B. Calculate pipe slope and utilize roughness coefficients C. Design required pipe size by equations and charts. D. Determine detention pond size and outflow requirements
7	Open channel flow A. Calculate flow in circular, rectangular and trapezoidal channels. B. Determine hydraulic radius. C. Identify most efficient cross-sections.
8	Flow measurement in open channels A. Identify the principles of stream gauging. B. Calculate flow over weirs.
9	Flow measurement in closed conduits A. Identify various types of measuring devices. B. Calculate flow through Venturi meters, nozzles and orifices.
10	Culvert analysis A. Analyze flow through culverts. B. Utilize basic design principles
11	Examinations

APPENDIX C

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
	Goad #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	Mandatory participation with ACS for students enrolled in CONM 100 Hold an internal competition to make it easier for students to participate Procure additional funding to reduce costs for participation		Student feedback in survey
Promote personal attention in the classroom and through advising	Classroom observation Advisor training for faculty (Program Advisors)	Take attendance at training session(s)	Student feedback in survey
Increase faculty and equipment resources to enhance classroom experiences	Implement a campaign to build an endowment to support classroom materials, equipment, site visits Pursue grants from foundations	Identify potential donors Identify potential foundations for grants Track potential donor contact Track donations	
Keep Program current with industry knowledge requirements	IAB involvement with curriculum changes Review 2-3 courses at each IAB meeting for content		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	Visits to career fairs at high schools Visits to career tech centers Attend Michigan Construction Career Days and other industry-sponsored events to recruit students	Fall and Spring 4th Day counts	
Increase enrollment of females	Create new video featuring current female students to explain why they chose construction management Develop promotional materials that are focused toward females	Track number of female students applying and actually enrolling	
Increase enrollment of minorities	Increase visits to urban school districts for career presentation Develop relationships with focused groups Explore developing relationships with minority contractors and associations to help identify potential students	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	

APPENDIX D

COURSE LEARNING OUTCOMES MAP

COURSE #	CLO #	COURSE LEARNING OUTCOME	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
BCTM 213 Wood and Steel Framing and Interior Finishes	1	Complete the layout, assembly, and construction of a 2-story structure comprised of wood and metal framing members.			Lab observation	Satisfactory completion of wood framed structure as determined by faculty
					Lab observation	Satisfactory completion of steel framed structure as determined by faculty
	2	Understand carpentry skills and methods utilized in the construction industry	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Successfully perform mathematical requirements and layout for a wood framed wall, stair, and comon/hip/jack rafter
	3	Apply principles of construction mathematics			Test - Internal	Complete mathematical equations required in construction framing
BCTM 217 Virtual Design and Construction	1	Acquire knowledge and skills to generate and modify Building Information Technology models of MEP (Mechanical, Electrical, Plumbing) systems.	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Use BIM models of a building and site to extract information
	2	Demonstrate how to combine 3D geometry from cross disciplines into one scene to enable effective model reviews	SLO 10	Apply electronic-based technology to manage the construction process	Test - Internal	Use BIM models of a building and site to extract information
	3	Create and modify basic Building Information Technology models of Civil, Architecture, Structure, and MEP (Mechanical, Electrical, Plumbing) to extract specific information in multiple dimensions	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Use BIM models of a building and site to extract information
	4	Document and animate models and their extracted information	SLO 1	Create written communication appropriate to the construction discipline	Assignment	Create a model for presentation and document the extracted information
BCTM 234 Electrical Construction Practices	1	Understand and interpret construction documents			Test - Internal	Use construction documents to answer questions pertaining to electrical systems
	2	Describe basic system(s) theory and operation	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Explain the basic principles of construction electrical systems
	3	Identify major materials, equipment and appurtenances			Test - Internal	Identify materials, equipment from drawings
	4	Explain site issues and construction methods for systems installation and testing			Test - Internal	Identify typical site conditions encountered with electrical systems and the methods used for installation
	5	Demonstrate basic construction techniques common to these systems			Lab observation	Lab observations as students complete basic electrical installation practices

COURSE #	CLO #	COURSE LEARNING OUTCOME	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
BCTM 235 Mechanical Construction Practices	1	Understand and interpret construction documents			Test - Internal	Use construction documents to answer questions related to mechanical systems
	2	Describe basic system(s) theory and operation	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Explain the basic principles of construction mechanical systems
	3	Identify major materials, equipment and appurtenances			Test - Internal	Identify materials, equipment from drawings
	4	Explain site issues and construction methods for systems installation and testing			Test - Internal	Identify typical site conditions encountered with mechanical systems and the methods used for installation
	5	Demonstrate basic construction techniques common to these systems			Lab observation	Lab observations as students complete basic mechanical installation practices
CETM 214 Advanced Materials Properties and Testing	1	Test, identify, analyze and blend materials for a HMA trial batch designed to meet Superpave specifications	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate FAA aggregate proportions
	2	Compute HMA Volumetric Properties for proposed mix designs, test HMA trial batches, and compare test results to Superpave criteria	SLO 15	Understand construction quality assurance and control	Assignment	Generate lab reports for appropriate tests conducted during labs
	3	Test, identify, analyze, and combine materials to prepare a concrete mix design	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate concrete mic proportions to achieve specific compressive strengths
			SLO 15	Understand construction quality assurance and control	Assignment	Generate lab reports for appropriate tests conducted during labs
CETM 215 Construction Equipment and Operations	1	Determine ownership and operating costs of construction equipment	SLO 4	Create construction project cost estimates	Assignment	Determine ownership and operation cost of construction equipment
	2	Understand basics of equipment operation and efficiency	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate equipment efficiency rates
	3	Determine production rates for equipment commonly used on highway and bridge construction	SLO 8	Analyze construction documents for planning and management of construction processes	Assignment	Determine production rates for equipment commonly used on highway and bridge construction
	4	Calculate bid prices based on equipment productivity			Assignment	Calculate bid prices for civil items
CETM 226 Highway Technology	1	Perform the planning and design processes for highways			Test - Internal	Perform the planning and design processes for highways
	2	Calculate the geometric design elements of roadways			Test - Internal	Calculate the geometric design elements of roadways
	3	Demonstrate the methods utilized by AASHTO for structural pavement design	SLO 19	Understand the basic principles of structural behavior	Project	Determine the appropriate pavement structure given certain traffic loads
	4	Design geometric elements and draw road plan elements utilizing current industry standard software	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Design a sag vertical curve with associated geometric elements

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CETM 227 Hydraulics and Hydrology	1	Calculate hydrostatic pressures and resultant vector forces and their locations on submerged surfaces			Assignment	Complete calculations to determine the pressure on a submerged surface such as a gate or dam
	2	Perform hydrodynamic calculations on fluids in open and closed conduits	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Perform hydrodynamic calculations on fluids in open and closed conduits
	3	Perform hydrologic calculations on a watershed			Assignment	Perform hydrologic calculations on a watershed
	4	Understand hydraulic methods of storm water control			Test - Internal	Explain hydraulic methods of storm water control
CONM 100 Orientation to Construction Management	1	Become familiar with campus resources and technology (academic, student, and personal support services				
	2	Develop an awareness of teaching / learning styles and how to use a variety of study strategies to adapt in various learning environments				
	3	Gain an understanding of wellness issues that directly affect their health and safety				
	4	Learn to develop effective time management and goal setting strategies				
	5	Learn to understand, respect, and value diversity in its many forms				
	6	Learn about academic advisor/advisee relationships and course registration				
	7	Become active participants and contributors in the campus and community				
	8	Learn about and understand academic integrity and classroom etiquette skills that foster appropriate conduct in a post-secondary institutional setting				
	9	Be introduced to financial literacy				
	10	Learn about the University's mission, core values, and historical development				
CONM 111 Construction Practices	1	Apply methods of structure layout	SLO 11	Apply basic surveying techniques for construction layout and control	Test - Internal	Using the proper equipment, determine a basic project layout
	2	Demonstrate an understanding of materials, methods and basic equipment of construction	SLO 8	Analyze methods, materials, and equipment used to construct a project	Assignment	Determine the materials and equipment required to complete a concrete project
	3	Demonstrate basic crew safety	SLO 3	Create a construction safety plan	Assignment	Prepare a tool use safety presentation
	4	Prepare basic quantity take offs of materials			Assignment	Prepare a quantity take off of an assigned model building

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CONM 112 Plans and Specifications	1	Identify specific dimensions, locations, installation, and material requirements on commercial and industrial project plans and specifications	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Identify construction materials required for a project using a set of plans and specifications
	2	Perform very basic quantity takeoffs from commercial and industrial construction plans			Test - Internal	Complete basic quantity takeoffs from supplied drawings
	3	Identify the components of road and bridge construction			Test - Internal	Identify components from drawings
	4	Explain the design process and how plans and specifications are intricately related			Test - Internal	Describe the process steps from the owner's concept to construction start
	5	Accurately read an architectural and an engineering scale			Assignment	Determine lengths of lines in different scales
CONM 116 Construction Graphics	1	Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in two dimensions	SLO 1	Create written communication appropriate to the construction discipline	Project	Create representations of a structure with the appropriate nomenclature and dimensions in two dimensions by hand
	2	Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in three dimensions	SLO 1	Create written communication appropriate to the construction discipline	Project	Create representations of a structure with the appropriate nomenclature and dimensions in three dimensions on the computer
CONM 117 Construction Building Information Technology	1	Demonstrate word processing, spreadsheet, and presentation software proficiency on a variety of assignments typical in the construction industry	SLO 1	Create written communication appropriate to the construction discipline	Tets - Internal	Manipulate or create word processing documents, spreadsheets, and presentation software
	2	Explain how Building Information Technology (BIT) is used in the industry and the processes that make up BIT as they apply to information in a company that uses BIT techniques	SLO 10	Apply electronic-based technology to manage the construction process	Test - Internal	Final exam - Explain how BIM is used in the industry
	3	Create and modify basic multi-dimensional Building Information Technology models with Civil, Architecture, and Structure	SLO 10	Apply electronic-based technology to manage the construction process	Project	Building study project that uses plans and specifications from CONM 112 and includes sitework, architecture, and structural components
CONM 121 Materials Properties & Testing	1	Describe the properties of construction materials			Test - Internal	Determine the properties/characteristics of various construction materials
	2	Demonstrate an understanding of material properties through industry-standard testing	SLO 8	Analyze methods, materials, and equipment used to construct a project	Test - Internal	Solve problems based on construction material properties
	3	Create formal written laboratory reports	SLO 1	Create written communication appropriate to the construction discipline	Written Product (Lab Report)	Generate lab reports for appropriate tests conducted during labs

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CONM 122 Construction Surveying & Layout	1	The learner will be able to accurately measure and record surveying field data	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises
	2	The learner will be able to accurately calculate and layout construction surveying data	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises
CONM 211 Construction Estimating I	1	Obtain estimating data from industry sources	SLO 4	Create construction project cost estimates	Assignment	Use R.S.Means to procure unit costs, city indexes, and crew information
	2	Perform quantity takeoffs utilizing contract documents	SLO 4	Create construction project cost estimates	Test - Internal	Complete various quantity takeoffs
	3	Complete a bid proposal	SLO 4	Create construction project cost estimates	Test - Internal	Complete a bid proposal
	4	Utilize technology to complete bid estimates	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Create a construction estimate using computer software.
	5	Discuss ethical iddues in bidding	SLO 6	Analyze professional decisions based on ethical principles	Test - Internal	Identify ethical issues in bidding scenarios
CONM 212 Soils and Foundations	1	Recognize the interaction between water and soil			Test - Internal	Identify expected behavior when different soils are exposed to water
	2	Calculate soil bearing capacity	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Calculate soil bearing capacity
	3	Identify the elements of soil compaction			Test - Internal	Identify different methods of soil compaction
	4	Identify soil characteristics using field and laboratory techniques			Observations - Lab	Identify soil characteristics in the lab
	5	Understand principles of foundation design an analysis	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Determine required foundation sizes given certain soil parameters and characteristics
CONM 221 Statics & Structures	1	Understand equilibrium, free body diagrams, and vector analysis			Test - Internal	Draw a free body diagram to explain structural forces
	2	Apply the concepts of equilibrium and free body diagrams to the analysis and design of basic structural elements			Test - Internal	Develop equations of static equilibrium for different forces
	3	Apply structural analysis and design using wood and metals	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Apply structural analysis and design methods for different construction materials

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CONM 222 Construction Administration	1	Understand construction delivery systems	SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	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
	2	Understand basic elements of construction scheduling	SLO 5	Create construction project schedules	Assignment	Identify different scheduling methods, define scheduling terms, estimate the duration of given activities
	3	Create basic construction documentation	SLO 7	Analyze construction documents for planning and management of construction processes	Certification Exam	the Procore Project Manager Core Tools certificate and one of the following: Project Management; Quality & Safety; Superintendent;
	4	Understand the requirements of delivering a construction project based on time, cost and quality	SLO 14	Understand construction accounting and cost control	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs
			SLO 15	Understand construction quality assurance and control		
	5	Understand the nature of changes to the construction process			Assignment	Complete a Change Order, assigning work scopes
CONM 225 Field Engineering	1	Examine site erosion and storm water control	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Examine soil erosion and storm water control
	2	Examine codes, ordinances, regulations, and operations documentation	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Examine codes, ordinances, regulations, and operations documentation
	3	Establish and calculate horizontal and vertical control points for construction site layout	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Establish and calculate horizontal and vertical control points for construction layout
	4	Calculate and perform construction site layout	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Calculate and perform construction layout
CONM 311 Foundations & Temporary Structures	1	Calculate basic loads and forces on temporary structures			Test - Internal	Calculate basic loads and forces on temporary structures
	2	Recognize the major elements of construction rigging			Test - Internal	Identify ad select the major elements of constrution rigging
	3	Identify the most common materials and methods used in concrete installation	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Identify the most common materials and methods used in concrete installation
	4	Calculate design loads and pressures in formwork applications			Test - Internal	Calculate design loads and pressures for formwork plan
	5	Select formwork members from applied loads and pressures	SLO 8	Analyze methods, materials, and equipment used to construction a project	Project	Select formwork members from applied loads and pressures to create a formwork plan
			SLO 19	Understand the basic principles of structural behavior		

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CONM 312 Construction Scheduling	1	Develop an activity listing and corresponding duration for a construction project	SLO 5	Create construction project schedules	Assignment	Develop an activity list and activity durations from project drawings
	2	Develop a construction schedule both manually and electronically	SLO 5	Create construction project schedules	Assignment	Create a project schedule using a scheduling software program
			SLO 10	Apply electronic-based technology to manage the construction process		
	3	Perform a resource allocation on a schedule	SLO 16	Understand construction project control processes	Assignment	Draw a precedence diagram and the resource usage histograms
	4	Calculate activity values and cost load the corresponding schedule	SLO 14	Understand construction accounting and cost control	Assignment	Using a precedence network, determine costs for each activity
			SLO 16	Understand construction project control processes		
	5	Present a finalized construction schedule	SLO 5	Create construction project schedules	Test - Internal	Create a project schedule as a network diagram and a bar chart
CONM 321 Construction Estimating II	1	Develop conceptual estimates using various methods	SLO 4	Create construction project cost estimates	Assignment	Conceptually estimate a project using 3 different methods
	2	Analyze factors that impact unit costs and productivity	SLO 8	Analyze methods, materials, and equipment used to construction a project	Assignment	Breakdown an assembly into its individual cost components and identify 3 work improvement factors
	3	Describe overhead allocation and profit determination	SLO 14	Understand construction accounting and cost control	Assignment	Calculate specific overhead costs and balance/unbalance the bid
	4	Understand construction cost control	SLO 14	Understand construction accounting and cost control	Assignment	Develop a cash flow projection table and calculate loan costs
	5	Understand basic statistical techniques			Assignment	Complete a frequency histogram; calculate mean, median, mode, range, variance, and standard deviation
CONM 324 Advanced Construction Computer Techniques and Technology	1	Demonstrate proficiency in the use of software application used in construction operations	SLO 4	Create construction project cost estimates	Assignment	Create an estimate using Excel
			SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Link and embed information across various MS Office programs
	2	Apply a variety of construction industry-specific technologies to construction projects	SLO 4	Create construction project cost estimates	Assignment	Utilize construction specific software to perform take-offs of earthwork related activities.
					Assignment	Utilize construction specific software to perform take-offs of building components
			SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Utilize construction specific software to coordinate 3D models between various stakeholders and improve construction efficiency and communication
					Assignment	Utilize construction specific software to integrate schedules with 4D software
					Assignment	Utilize construction specific software to complete 5D take-offs of model based projects.
	3	Demonstrate the use of advanced field software and technology applications			Test - Internal	

COURSE #	CLO #	COURSE LEARNING OUTCOME	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 373 Professionalism and Ethics in Construction	1	Evaluate the major theories of ethics				
	2	Understand professional codes of ethics				
	3	Develop leadership and ethical project management skills for the construction industry				
	4	Develop personal skills for facing ethical dilemmas	SLO 6	Analyze professional decisions based on ethical principles	Written Product	Interview with a construction professional regarding ethical situations typical to construction
CONM 412 Construction Contracts	1	Compare and contrast the standard documents used in the construction industry	SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	Test - Internal	Describe contractual relationships between construction parties
	2	Interpret administrative procedures required by the contract documents			Test - Internal	Interpret administrative procedures required by the contract documents
	3	Application of general business law as it applies to the construction industry	SLO 17	Understand the legal implications of contract, common, and regulatory law to manage a construction project	Test - Internal	Apply general business law to issues in construction
	4	Evaluate inherent contractual risk	SLO 13	Understand construction risk management	Test - Internal	Given a case study, evaluate the contractual risk
CONM 413 Construction Economics	1	Perform comparative analysis using common techniques of "Engineering Economic Analysis".			Test - Internal	Net present worth and annal cash flow analysis
CONM 424 Safety & Management	1	1. Analyze the application of safety management in the construction industry			Oral Presentation	Present a pre-approved safety topic to the class. 10 minute presentation
					Test - Internal	Evaluate methods of correcting safety hazards on a construction site
	2	Develop a Site Specific Safety Plan	SLO 3	Create a construction safety plan	Assignment	Develop a site specific safety plan from the viewpoint of an assigned trade subcontractor
	3	Evaluate ethical conduct based upon the situation	SLO 6	Analyze professional decisions based on ethical principles	Assignment	Analyze a current case study highlighting ethical issues regarding safety
CONM 460	1	Explain the significance of the current topic within the construction industry			Written Product (Paper)	Write a three page paper investigating a current topic in the construction industry
	2	Analyze any ethical conduct concerns with the current topic			Assignment	Evaluate the proper ethical conduct based upon case study situations taken from sample cases provided by industry
	3	Identify any unique methods or costs associated with this current topic			Test - Internal	Review a case study regarding a unique method and answer a set of ten questions
CONM 461 Sustainability	1	Explain and apply basic principles of sustainable construction	SLO 18		Written Product (Paper)	Write a three page paper investigating a sustainability issue
	2	Analyze any ethical conduct concerns with the current topic			Assignment	Evaluate the proper ethical conduct based upon case study situations
	3	Explain/identify the different methods of rating sustainable building practices	SLO 18		Test - Internal	Review a case study regarding a unique method and answer a set of ten questions

COURSE #	CLO #	COURSE LEARNING OUTCOME	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 462 Power and Process Plant Construction	1	Describe the characteristics and components for construction of large plant facilities				
	2	Understand basic sources of energy and types of power generation and process plants				
	3	Identify basic plant engineering principles				
	4	Develop a large sscale site plan and project management plan				
CONM 463 Infrastructure Construction	1	Understand basic civil engineering design and construction for construction infrastructure				
	2	Review construction and design documents as part of construction planning				
	3	Understand major materials and construction methods used in infrastructure construction				
	4	Understand the basic elements of structural behavior in civil construction	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Analyze structural behavior of infrastructure construction
	5	Understand the basic principles of mechanical, electrical, piping and plumbing planning	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Describe the main components of MEP systems in civil projects

COURSE #	CLO #	COURSE LEARNING OUTCOME	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 499 Construction Project Management	1	Understand the concepts of project management in the construction industry	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Analyze construction documents to plan and manage th construction process
			SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	Test - Internal	Identify roles, responsibilities, and relationships of project delivery methods
	2	Integrate technical, business, and ethical concerns in a project context	SLO 6	Analyze professional decisions based on ethical principles	Test - Internal	Evaluate construction industry ethical case studies
			SLO 13	Understand construction risk management	Test - Internal	Explain/identify basic elements of risk analysis
	3	Create professional construction management submittals from construction project documents (ACCE SLO #3, 4, 5, 9, 15, 16) - safety plan, estimate, schedule, team member evaluation, QA/QC, project control process	SLO 3	Create a construction safety plan	Written Product	Write a portion of a project safety plan for a construction project
			SLO 4	Create construction project cost estimates	Written Product	Prepare a project cost estimate as part of a student team
			SLO 5	Create construction project schedules	Written Product	Prepare a project schedule as part of a student team
			SLO 9	Apply construction management skill as a member of a multi-disciplinary team	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities
			SLO 15	Understand construction quality assurance and control	Written Product	Complete a project QA/QC plan as part of the student team project
			SLO 16	Understand construction project control processes	Test - Internal	Identify project control techniques
	4	Successfully present student team work to faculty and industry representatives	SLO 1	Create written communication appropriate to the construction discipline	Written Product	Create technical memoranda on student team project
			SLO 2	Create oral presentation appropriate to the construction industry	Oral Presentation	Student team presentation
			SLO 9	Apply construction management skill as a member of a multi-disciplinary team	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities

Ferris State University
CTMG Program
Student Learning Outcomes
ACCE Accreditation Matrix

		CONM 100	CONM 111	CONM 112	CONM 116	CONM 117	CONM 121	CONM 122	CONM 211	CONM 212	CONM 221	CONM 222	CONM 225*	CONM 311	CONM 312	CONM 321	CONM 324	CONM 373*	CONM 412	CONM 413	CONM 424	CONM 461*	CONM 462*	CONM 463*	CONM 499	BCTM 217*	BCTM 213	BCTM 233*	BCTM 234*	CETM 214	CETM 226	CETM 215	CETM 227	MATH 120	MATH 132	PHYS 211	LAB SCI ELECT	ENGL 150	ENGL 211	ENGL 311	COMM 121	CUL ENRICH	SOC AWARE	ECON 221	BLAW 301	MGMT 3** ELECT	ACCT 221	AAS BUILDING	AAS CIVIL HIGHWAY
	Course Credit Hours:	1	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	1	3	3	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	3	3	9	6	3	3	3	3	125	125
1	Create written communication appropriate to the construction discipline.		I		I	IR	I			R															M													I	R	M								**10**	**10**
2	Create oral presentation appropriate to the construction discipline.												I		I										R																IR							**5**	**5**
3	Create a construction project safety plan.		I																		R				M																							**3**	**3**
4	Create construction project cost estimates.								I							R	R								M							I																**4**	**5**
5	Create construction project schedules.											I			R										M																							**3**	**3**
6	Analyze professional decisions based on ethical principles.								I									RM			I				R																							**5**	**5**
7	Analyze construction documents for planning and management of construction processes.			I								R	R												M																							**4**	**4**
8	Analyze methods, materials, and equipment used to construct project.		I				I			I				R		R											I			R		I																**6**	**7**
9	Apply construction management skill as a member of a multi-disciplinary team.																								IR																							**2**	**2**
10	Apply electronic-based technology to manage the construction process.					I									IR		IR									R					I																	**6**	**6**
11	Apply basic surveying techniques for construction layout and control.							I					R																																			**2**	**2**
12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.											I							R						R																							**3**	**3**
13	Understand construction risk management.																		I						I																							**2**	**2**
14	Understand construction accounting and cost control.											I			I	I																															IR	**5**	**5**
15	Understand construction quality assurance and control.											I										I	I	I	R					I																		**5**	**6**
16	Understand construction project control processes.														I										I																							**2**	**2**
17	Understand the legal implications of contract, common and regulatory law to manage a construction project.												I						R																										I			**3**	**3**
18	Understand the basic principles of sustainable construction.												I									I								I																		**2**	**3**
19	Understand the basic principles of structural behavior.									I	I			R																	I																	**3**	**4**
20	Understand the basic principles of mechanical, electrical and piping systems.																						R					I	I				I															**3**	**2**
		0	3	1	1	3	2	1	2	3	1	5	5	2	6	3	3	2	3	0	2	2	2		13	1	1	1	1	3	2	2	1	0	0	0	0	1	1	1	2	0	0	0	1	0	2		
	Level of Understanding - Introductory	0	3	1	1	2	2	1	2	2	1	4	3	0	4	1	1	0	1	0	1	2	1		3	0	1	1	1	2	2	2	1	0	0	0	0	1	0	0	1	0	0	0	1	0	1		
	Level of Understanding - Reinforcement	0	0	0	0	1	0	0	0	1	0	1	2	2	2	2	2	1	2	0	1	0	1		5	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1		
	Level of Understanding - Mastery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		

APPENDIX E

COURSES WITH ASSOCIATED ACCE SLOs				
COURSE #	**SLO #**	**STUDENT LEARNING OUTCOME**	**METHOD**	**ASSESSMENT**
BCTM 213 Wood and Steel Framing and Interior Finishes	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Successfully perform mathematical requirements and layout for a wood framed wall, stair, and comon/hip/jack rafter
BCTM 217 Virtual Design and Construction	SLO 1	Create written communication appropriate to the construction discipline	Assignment	Create a model for presentation and document the extracted information
BCTM 217 Virtual Design and Construction	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Use BIM models of a building and site to extract information
BCTM 217 Virtual Design and Construction	SLO 10	Apply electronic-based technology to manage the construction process	Test - Internal	Use BIM models of a building and site to extract information
BCTM 217 Virtual Design and Construction	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Use BIM models of a building and site to extract information
BCTM 234 Electrical Construction Practices	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Explain the basic principles of construction electrical systems
BCTM 235 Mechanical Construction Practices	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Explain the basic principles of construction mechanical systems
CETM 214 Advanced Materials Properties and Testing	SLO 15	Understand construction quality assurance and control	Assignment	Generate lab reports for appropriate tests conducted during labs
CETM 214 Advanced Materials Properties and Testing	SLO 15	Understand construction quality assurance and control	Assignment	Generate lab reports for appropriate tests conducted during labs
CETM 214 Advanced Materials Properties and Testing	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate FAA aggregate proportions
CETM 214 Advanced Materials Properties and Testing	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate concrete mic proportions to achieve specific compressive strengths
CETM 215 Construction Equipment and Operations	SLO 4	Create construction project cost estimates	Assignment	Determine ownership and operation cost of construction equipment
CETM 215 Construction Equipment and Operations	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Calculate equipment efficiency rates
CETM 215 Construction Equipment and Operations	SLO 8	Analyze construction documents for planning and management of construction processes	Test - Internal	Determine equipment production rates for earthwork and paving equipment used on highway and bridge costruction

COURSE #	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CETM 226 Highway Technology	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Design a sag vertical curve with associated geometric elements
CETM 226 Highway Technology	SLO 19	Understand the basic principles of structural behavior	Project	Determine the appropriate pavement structure given certain traffic loads
CETM 227 Hydraulics and Hydrology	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Perform hydrodynamic calculations on fluids in open and closed conduits
CONM 111 Construction Practices	SLO 11	Apply basic surveying techniques for construction layout and control	Test - Internal	Using the proper equipment, determine a basic project layout
CONM 111 Construction Practices	SLO 3	Create a construction safety plan	Assignment	Prepare a tool use safety presentation
CONM 111 Construction Practices	SLO 8	Analyze methods, materials, and equipment used to construct a project	Assignment	Determine the materials and equipment required to complete a concrete project
CONM 112 Plans and Specifications	SLO 7	Analyze construction documents for planning and management of construction	Test - Internal	Identify construction materials required for a project using a set of plans and
CONM 116 Construction Graphics	SLO 1	Create written communication appropriate to the construction discipline	Project	Create representations of a structure with the appropriate nomenclature and dimensions in two dimensions by hand
CONM 116 Construction Graphics	SLO 1	Create written communication appropriate to the construction discipline	Project	Create representations of a structure with the appropriate nomenclature and dimensions in three dimensions on the computer
CONM 117 Construction Building Information Technology	SLO 1	Create written communication appropriate to the construction discipline	Tets - Internal	Manipulate or create word processing documents, spreadsheets, and presentation software
CONM 117 Construction Building Information Technology	SLO 10	Apply electronic-based technology to manage the construction process	Test - Internal	Final exam - Explain how BIM is used in the industry
CONM 117 Construction Building Information Technology	SLO 10	Apply electronic-based technology to manage the construction process	Project	Building study project that uses plans and specifications from CONM 112 and includes sitework, architecture, and structural components
CONM 121 Materials Properties & Testing	SLO 1	Create written communication appropriate to the construction discipline	Written Product (Lab Report)	Generate lab reports for appropriate tests conducted during labs
CONM 121 Materials Properties & Testing	SLO 8	Analyze methods, materials, and equipment used to construct a project	Test - Internal	Solve problems based on construction material properties
CONM 122 Construction Surveying & Layout	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises
CONM 122 Construction Surveying & Layout	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises

COURSE #	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 211 Construction Estimating I	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Create a construction estimate using computer software.
CONM 211 Construction Estimating I	SLO 4	Create construction project cost estimates	Assignment	Use R.S.Means to procure unit costs, city indexes, and crew information
CONM 211 Construction Estimating I	SLO 4	Create construction project cost estimates	Test - Internal	Complete various quantity takeoffs
CONM 211 Construction Estimating I	SLO 4	Create construction project cost estimates	Test - Internal	Complete a bid proposal
CONM 211 Construction Estimating I	SLO 6	Analyze professional decisions based on ethical principles	Test - Internal	Identify ethical issues in bidding scenarios
CONM 212 Soils and Foundations	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Determine required foundation sizes given certain soil parameters and characteristics
CONM 212 Soils and Foundations	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Calculate soil bearing capacity
CONM 221 Statics & Structures	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Apply structural analysis and design methods for different construction materials
CONM 222 Construction Administration	SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and	Assignment	Complete an organization chart for a CM using a specific type of contract; identify the trade worker with the worker description
CONM 222 Construction Administration	SLO 14	Understand construction accounting and cost control	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs
CONM 222 Construction Administration	SLO 15	Understand construction quality assurance and control	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs
CONM 222 Construction Administration	SLO 5	Create construction project schedules	Assignment	Identify different scheduling methods, define scheduling terms, estimate the duration of given activities
CONM 222 Construction Administration	SLO 7	Analyze construction documents for planning and management of construction processes	Certification Exam	Complete the Procore Project Manager Core Tools certificate and one of the following: Project Management; Quality & Safety; Superintendent; Engineer; Subcontractor
CONM 225 Field Engineering	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Establish and calculate horizontal and vertical control points for construction layout
CONM 225 Field Engineering	SLO 11	Apply basic surveying techniques for construction layout and control	Written Product (Lab Report)	Calculate and perform construction layout
CONM 225 Field Engineering	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Examine soil erosion and storm water control
CONM 225 Field Engineering	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Examine codes, ordinances, regulations, and operations documentation

COURSE #	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 311 Foundations & Temporary Structures	SLO 19	Understand the basic principles of structural behavior	Project	Select formwork members from applied loads and pressures to create a formwork plan
CONM 311 Foundations & Temporary Structures	SLO 8	Analyze methods, materials, and equipment used to construction a project	Test - Internal	Identify the most common materials and methods used in concrete installation
CONM 311 Foundations & Temporary Structures	SLO 8	Analyze methods, materials, and equipment used to construction a project	Project	Select formwork members from applied loads and pressures to create a formwork plan
CONM 312 Construction Scheduling	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Create a project schedule using a scheduling software program
CONM 312 Construction Scheduling	SLO 14	Understand construction accounting and cost control	Assignment	Using a precedence network, determine costs for each activity
CONM 312 Construction Scheduling	SLO 16	Understand construction project control processes	Assignment	Draw a precedence diagram and the resource usage histograms
CONM 312 Construction Scheduling	SLO 16	Understand construction project control processes	Assignment	Using a precedence network, determine costs for each activity
CONM 312 Construction Scheduling	SLO 5	Create construction project schedules	Assignment	Develop an activity list and activity durations from project drawings
CONM 312 Construction Scheduling	SLO 5	Create construction project schedules	Assignment	Create a project schedule using a scheduling software program
CONM 312 Construction Scheduling	SLO 5	Create construction project schedules	Test - Internal	Create a project schedule as a network diagram and a bar chart
CONM 321 Construction Estimating II	SLO 14	Understand construction accounting and cost control	Assignment	Calculate specific overhead costs and balance/unbalance the bid
CONM 321 Construction Estimating II	SLO 14	Understand construction accounting and cost control	Assignment	Develop a cash flow projection table and calculate loan costs
CONM 321 Construction Estimating II	SLO 4	Create construction project cost estimates	Assignment	Conceptually estimate a project using 3 different methods
CONM 321 Construction Estimating II	SLO 8	Analyze methods, materials, and equipment used to construction a project	Assignment	Breakdown an assembly into its individual cost components and identify 3 work improvement factors
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Link and embed information across various MS Office programs
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Utilize construction specific software to coordinate 3D models between various stakeholders and improve construction efficiency and communication
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Utilize construction specific software to integrate schedules with 4D software
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 10	Apply electronic-based technology to manage the construction process	Assignment	Utilize construction specific software to complete 5D take-offs of model based projects.

COURSE #	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 4	Create construction project cost estimates	Assignment	Create an estimate using Excel
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 4	Create construction project cost estimates	Assignment	Utilize construction specific software to perform take-offs of earthwork related activities.
CONM 324 Advanced Construction Computer Techniques and Technology	SLO 4	Create construction project cost estimates	Assignment	Utilize construction specific software to perform take-offs of building components
CONM 373 Professionalism and Ethics in Construction	SLO 6	Analyze professional decisions based on ethical principles	Written Product	Interview with a construction professional regarding ethical situations typical to construction
CONM 412 Construction Contracts	SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	Test - Internal	Describe contractual relationships between construction parties
CONM 412 Construction Contracts	SLO 13	Understand construction risk management	Test - Internal	Given a case study, evaluate the contractual risk
CONM 412 Construction Contracts	SLO 17	Understand the legal implications of contract, common, and regulatory law to manage a construction project	Test - Internal	Apply general business law to issues in construction
CONM 424 Safety & Management	SLO 3	Create a construction safety plan	Assignment	Develop a site specific safety plan from the viewpoint of an assigned trade subcontractor
CONM 424 Safety & Management	SLO 6	Analyze professional decisions based on ethical principles	Assignment	Analyze a current case study highlighting ethical issues regarding safety
CONM 461 Sustainability	SLO 18	Understand the basic principles of sustainable construction	Written Product (Paper)	Write a three page paper investigating a sustainability issue
CONM 461 Sustainability	SLO 18	Understand the basic principles of sustainable construction	Test - Internal	Review a case study regarding a unique method and answer a set of ten questions
CONM 463 Infrastructure Construction	SLO 19	Understand the basic principles of structural behavior	Test - Internal	Analyze structural behavior of infrastructure construction
CONM 463 Infrastructure Construction	SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	Test - Internal	Describe the main components of MEP systems in civil projects
CONM 499 Construction Project Management	SLO 1	Create written communication appropriate to the construction discipline	Written Product	Create technical memoranda on student team project

COURSE #	SLO #	STUDENT LEARNING OUTCOME	METHOD	ASSESSMENT
CONM 499 Construction Project Management	SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	Test - Internal	Identify roles, responsibilities, and relationships of project delivery methods
CONM 499 Construction Project Management	SLO 13	Understand construction risk management	Test - Internal	Explain/identify basic elements of risk analysis
CONM 499 Construction Project Management	SLO 15	Understand construction quality assurance and control	Written Product	Complete a project QA/QC plan as part of the student team project
CONM 499 Construction Project Management	SLO 16	Understand construction project control processes	Test - Internal	Identify project control techniques
CONM 499 Construction Project Management	SLO 2	Create oral presentation appropriate to the construction industry	Oral Presentation	Student team presentation
CONM 499 Construction Project Management	SLO 3	Create a construction safety plan	Written Product	Write a portion of a project safety plan for a construction project
CONM 499 Construction Project Management	SLO 4	Create construction project cost estimates	Written Product	Prepare a project cost estimate as part of a student team
CONM 499 Construction Project Management	SLO 5	Create construction project schedules	Written Product	Prepare a project schedule as part of a student team
CONM 499 Construction Project Management	SLO 6	Analyze professional decisions based on ethical principles	Test - Internal	Evaluate construction industry ethical case studies
CONM 499 Construction Project Management	SLO 7	Analyze construction documents for planning and management of construction processes	Test - Internal	Analyze construction documents to plan and manage the construction process
CONM 499 Construction Project Management	SLO 9	Apply construction management skill as a member of a multi-disciplinary team	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities
CONM 499 Construction Project Management	SLO 9	Apply construction management skill as a member of a multi-disciplinary team	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities

SLO + COURSE NUMBER

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 1	Create written communication appropriate to the construction discipline	BCTM 217 Virtual Design and Construction	Assignment	Create a model for presentation and document the extracted information
SLO 1	Create written communication appropriate to the construction discipline	CONM 116 Construction Graphics	Project	Create representations of a structure with the appropriate nomenclature and dimensions in two dimensions by hand
SLO 1	Create written communication appropriate to the construction discipline	CONM 116 Construction Graphics	Project	Create representations of a structure with the appropriate nomenclature and dimensions in three dimensions on the
SLO 1	Create written communication appropriate to the construction discipline	CONM 117 Construction Building Information Technology	Tets - Internal	Manipulate or create word processing documents, spreadsheets, and presentation software
SLO 1	Create written communication appropriate to the construction discipline	CONM 121 Materials Properties & Testing	Written Product (Lab Report)	Generate lab reports for appropriate tests conducted during labs
SLO 1	Create written communication appropriate to the construction discipline	CONM 499 Construction Project Management	Written Product	Create technical memoranda on student team project
SLO 2	Create oral presentation appropriate to the construction industry	CONM 499 Construction Project Management	Oral Presentation	Student team presentation
SLO 3	Create a construction safety plan	CONM 111 Construction Practices	Assignment	Prepare a tool use safety presentation
SLO 3	Create a construction safety plan	CONM 424 Safety & Management	Assignment	Develop a site specific safety plan from the viewpoint of an assigned trade subcontractor
SLO 3	Create a construction safety plan	CONM 499 Construction Project Management	Written Product	Write a portion of a project safety plan for a construction project
SLO 4	Create construction project cost estimates	CETM 215 Construction Equipment and Operations	Assignment	Determine ownership and operation cost of construction equipment
SLO 4	Create construction project cost estimates	CONM 211 Construction Estimating I	Assignment	Use R.S.Means to procure unit costs, city indexes, and crew information
SLO 4	Create construction project cost estimates	CONM 211 Construction Estimating I	Test - Internal	Complete various quantity takeoffs
SLO 4	Create construction project cost estimates	CONM 211 Construction Estimating I	Test - Internal	Complete a bid proposal
SLO 4	Create construction project cost estimates	CONM 321 Construction Estimating II	Assignment	Conceptually estimate a project using 3 different methods
SLO 4	Create construction project cost estimates	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Create an estimate using Excel
SLO 4	Create construction project cost estimates	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to perform take-offs of earthwork related activities

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 4	Create construction project cost estimates	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to perform take-offs of building components
SLO 4	Create construction project cost estimates	CONM 499 Construction Project Management	Written Product	Prepare a project cost estimate as part of a student team
SLO 5	Create construction project schedules	CONM 222 Construction Administration	Assignment	Identify different scheduling methods, define scheduling terms, estimate the duration of given activities
SLO 5	Create construction project schedules	CONM 312 Construction Scheduling	Assignment	Develop an activity list and activity durations from project drawings
SLO 5	Create construction project schedules	CONM 312 Construction Scheduling	Assignment	Create a project schedule using a scheduling software program
SLO 5	Create construction project schedules	CONM 312 Construction Scheduling	Test - Internal	Create a project schedule as a network diagram and a bar chart
SLO 5	Create construction project schedules	CONM 499 Construction Project Management	Written Product	Prepare a project schedule as part of a student team
SLO 6	Analyze professional decisions based on ethical principles	CONM 211 Construction Estimating I	Test - Internal	Identify ethical issues in bidding scenarios
SLO 6	Analyze professional decisions based on ethical principles	CONM 373 Professionalism and Ethics in Construction	Written Product	Interview with a construction professional regarding ethical situations typical to construction
SLO 6	Analyze professional decisions based on ethical principles	CONM 424 Safety & Management	Assignment	Analyze a current case study highlighting ethical issues regarding safety
SLO 6	Analyze professional decisions based on ethical principles	CONM 499 Construction Project Management	Test - Internal	Evaluate construction industry ethical case studies
SLO 7	Analyze construction documents for planning and management of construction processes	CONM 112 Plans and Specifications	Test - Internal	Identify construction materials required for a project using a set of plans and specifications
SLO 7	Analyze construction documents for planning and management of construction processes	CONM 222 Construction Administration	Certification Exam	the Procore Project Manager Core Tools certificate and one of the following: Project Management; Quality & Safety;
SLO 7	Analyze construction documents for planning and management of construction processes	CONM 225 Field Engineering	Test - Internal	Examine soil erosion and storm water control
SLO 7	Analyze construction documents for planning and management of construction processes	CONM 225 Field Engineering	Test - Internal	Examine codes, ordinances, regulations, and operations documentation

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 7	Analyze construction documents for planning and management of construction processes	CONM 499 Construction Project Management	Test - Internal	Analyze construction documents to plan and manage th construction process
SLO 8	Analyze methods, materials, and equipment used to construction a project	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
SLO 8	Analyze construction documents for planning and management of construction processes	CETM 214 Advanced Materials Properties and Testing	Test - Internal	Calculate FAA aggregate proportions
SLO 8	Analyze construction documents for planning and management of construction processes	CETM 214 Advanced Materials Properties and Testing	Test - Internal	Calculate concrete mic proportions to achieve specific compressive strengths
SLO 8	Analyze construction documents for planning and management of construction processes	CETM 215 Construction Equipment and Operations	Test - Internal	Calculate equipment efficiency rates
SLO 8	Analyze construction documents for planning and management of construction processes	CETM 215 Construction Equipment and Operations	Test - Internal	Determine equipment production rates for earthwork and paving equipment used on highway and bridge costruction
SLO 8	Analyze methods, materials, and equipment used to construct a project	CONM 111 Construction Practices	Assignment	Determine the materials and equipment required to complete a concrete project
SLO 8	Analyze methods, materials, and equipment used to construct a project	CONM 121 Materials Properties & Testing	Test - Internal	Solve problems based on construction material properties
SLO 8	Analyze methods, materials, and equipment used to construction a project	CONM 212 Soils and Foundations	Test - Internal	Calculate soil bearing capacity
SLO 8	Analyze methods, materials, and equipment used to construction a project	CONM 311 Foundations & Temporary Structures	Test - Internal	Identify the most common materials and methods used in concrete installation
SLO 8	Analyze methods, materials, and equipment used to construction a project	CONM 311 Foundations & Temporary Structures	Project	Select formwork members from applied loads and pressures to create a formwork plan
SLO 8	Analyze methods, materials, and equipment used to construction a project	CONM 321 Construction Estimating II	Assignment	Breakdown an assembly into its individual cost components and identify 3 work improvement factors
SLO 9	Apply construction management skill as a member of a multi-disciplinary team	CONM 499 Construction Project Management	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities
SLO 9	Apply construction management skill as a member of a multi-disciplinary team	CONM 499 Construction Project Management	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities
SLO 10	Apply electronic-based technology to manage the construction process	BCTM 217 Virtual Design and Construction	Assignment	Use BIM models of a building and site to extract information
SLO 10	Apply electronic-based technology to manage the construction process	BCTM 217 Virtual Design and Construction	Test - Internal	Use BIM models of a building and site to extract information

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 10	Apply electronic-based technology to manage the construction process	BCTM 217 Virtual Design and Construction	Assignment	Use BIM models of a building and site to extract information
SLO 10	Apply electronic-based technology to manage the construction process	CETM 226 Highway Technology	Assignment	Design a sag vertical curve with associated geometric elements
SLO 10	Apply electronic-based technology to manage the construction process	CONM 117 Construction Building Information Technology	Test - Internal	Final exam - Explain how BIM is used in the industry
SLO 10	Apply electronic-based technology to manage the construction process	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
SLO 10	Apply electronic-based technology to manage the construction process	CONM 211 Construction Estimating I	Assignment	Create a construction estimate using computer software.
SLO 10	Apply electronic-based technology to manage the construction process	CONM 312 Construction Scheduling	Assignment	Create a project schedule using a scheduling software program
SLO 10	Apply electronic-based technology to manage the construction process	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Link and embed information across various MS Office programs
SLO 10	Apply electronic-based technology to manage the construction process	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
SLO 10	Apply electronic-based technology to manage the construction process	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to integrate schedules with 4D software
SLO 10	Apply electronic-based technology to manage the construction process	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to complete 5D take-offs of model based projects.
SLO 11	Apply basic surveying techniques for construction layout and control	CONM 111 Construction Practices	Test - Internal	Using the proper equipment, determine a basic project layout
SLO 11	Apply basic surveying techniques for construction layout and control	CONM 122 Construction Surveying & Layout	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises
SLO 11	Apply basic surveying techniques for construction layout and control	CONM 122 Construction Surveying & Layout	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises
SLO 11	Apply basic surveying techniques for construction layout and control	CONM 225 Field Engineering	Written Product (Lab Report)	Establish and calculate horizontal and vertical control points for construction layout
SLO 11	Apply basic surveying techniques for construction layout and control	CONM 225 Field Engineering	Written Product (Lab Report)	Calculate and perform construction layout
SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	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

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	CONM 412 Construction Contracts	Test - Internal	Describe contractual relationships between construction parties
SLO 12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	CONM 499 Construction Project Management	Test - Internal	Identify roles, responsibilities, and relationships of project delivery methods
SLO 13	Understand construction risk management	CONM 412 Construction Contracts	Test - Internal	Given a case study, evaluate the contractual risk
SLO 13	Understand construction risk management	CONM 499 Construction Project Management	Test - Internal	Explain/identify basic elements of risk analysis
SLO 14	Understand construction accounting and cost control	CONM 222 Construction Administration	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs
SLO 14	Understand construction accounting and cost control	CONM 312 Construction Scheduling	Assignment	Using a precedence network, determine costs for each activity
SLO 14	Understand construction accounting and cost control	CONM 321 Construction Estimating II	Assignment	Calculate specific overhead costs and balance/unbalance the bid
SLO 14	Understand construction accounting and cost control	CONM 321 Construction Estimating II	Assignment	Develop a cash flow projection table and calculate loan costs
SLO 15	Understand construction quality assurance and control	CETM 214 Advanced Materials Properties and Testing	Assignment	Generate lab reports for appropriate tests conducted during labs
SLO 15	Understand construction quality assurance and control	CETM 214 Advanced Materials Properties and Testing	Assignment	Generate lab reports for appropriate tests conducted during labs
SLO 15	Understand construction quality assurance and control	CONM 222 Construction Administration	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs
SLO 15	Understand construction quality assurance and control	CONM 499 Construction Project Management	Written Product	Complete a project QA/QC plan as part of the student team project
SLO 16	Understand construction project control processes	CONM 312 Construction Scheduling	Assignment	Draw a precedence diagram and the resource usage histograms
SLO 16	Understand construction project control processes	CONM 312 Construction Scheduling	Assignment	Using a precedence network, determine costs for each activity
SLO 16	Understand construction project control processes	CONM 499 Construction Project Management	Test - Internal	Identify project control techniques
SLO 17	Understand the legal implications of contract, common, and regulatory law to manage a construction project	CONM 412 Construction Contracts	Test - Internal	Apply general business law to issues in construction
SLO 18	Understand the basic principles of sustainable construction	CONM 461 Sustainability	Written Product (Paper)	Write a three page paper investigating a sustainability issue

SLO #	STUDENT LEARNING OUTCOME	COURSE #	METHOD	ASSESSMENT
SLO 18	Understand the basic principles of sustainable construction	CONM 461 Sustainability	Test - Internal	Review a case study regarding a unique method and answer a set of ten questions
SLO 19	Understand the basic principles of structural behavior	CETM 226 Highway Technology	Project	Determine the appropriate pavement structure given certain traffic loads
SLO 19	Understand the basic principles of structural behavior	CONM 212 Soils and Foundations	Test - Internal	Determine required foundation sizes given certain soil parameters and characteristics
SLO 19	Understand the basic principles of structural behavior	CONM 221 Statics & Structures	Test - Internal	Apply structural analysis and design methods for different construction materials
SLO 19	Understand the basic principles of structural behavior	CONM 311 Foundations & Temporary Structures	Project	Select formwork members from applied loads and pressures to create a formwork plan
SLO 19	Understand the basic principles of structural behavior	CONM 463 Infrastructure Construction	Test - Internal	Analyze structural behavior of infrastructure construction
SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	BCTM 234 Electrical Construction Practices	Test - Internal	Explain the basic principles of construction electrical systems
SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	BCTM 235 Mechanical Construction Practices	Test - Internal	Explain the basic principles of construction mechanical systems
SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	CETM 227 Hydraulics and Hydrology	Test - Internal	Perform hydrodynamic calculations on fluids in open and closed conduits
SLO 20	Understand the basic principles of mechanical, electrical, and piping systems	CONM 463 Infrastructure Construction	Test - Internal	Describe the main components of MEP systems in civil projects

APPENDIX F

Ferris State University
Advisory Board and Employer Survey

Name: ____ ☐ IAB Member

Company: ____

Job Description:
_______ Owner
_______ Senior Company Executive
_______ Project Manager
_______ Estimator
_______ Superintendent
_______ Project/Field Engineer
_______ Other (explain): ____________________________

Survey Objective. This survey is intended to assess how well our program meets the needs of the businesses that hire or may hire our students. Please indicate how well Ferris State University College of Engineering Technology graduates meet your expectations as an employer and/or as a member of the Advisory Board for the named degrees. Our graduates hold one or more of the following degrees: AAS in Building Construction Technology (BCTM) , AAS in Civil Engineering Technology(CETH), and BS in Construction Management (CONM).

The following characteristics focus on your experience/interaction with **Construction Management (4-year degree) graduates**.
Note: SLO refers to ACCE Student Learning Outcome and Applicable Course Reference
(Place an "X" under the appropriate response.)

	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Written communication effective and appropriate to the construction discipline (SLO #1)					
Oral communication effective and appropriate to the construction discipline (SLO #2)					
Overall construction safety understanding (SLO #3)					
Ability to create a construction safety plan (SLO #3)					
Overall estimating competency (SLO #4)					
Ability to create a construction project cost estimate (SLO #4)					
Ability to create a construction project schedule (SLO #5)					
Ability to analyze professional decisions based on ethical principles. Workplace ethics applied to construction management decisions (SLO #6)					
Visualization and blueprint reading competency (SLO #7)					
Other contract document interpretation and understanding (SLO #7)					
Understanding of construction methods, materials, and equipment (SLO #8)					
Ability to work within a multi-disciplinary team (SLO #9)					

Computer software competency to manage the construction process – BIM/3D Modeling (SLO #10)					
Computer software competency to manage the estimating process (SLO #10)					
Computer software competency to manage the project schedule (SLO #10)					
Other computer software competency (MS Office, email) (SLO #10)					
Surveying & Layout Competency and application to the project (SLO #11)					
Awareness and understanding of different methods of construction project delivery and the roles/responsibilities of those involved in the design and construction process (SLO #12)					
Recognize risks in the construction process (SLO #13)					
Understand options for mitigating construction risks (SLO #13)					
Understand construction accounting and cost control (SLO #14)					
Construction quality assurance and control competency (SLO #15)					
Understand and apply construction project control processes (SLO #16)					
Understand the legal implications of contract, common, and regulatory law to manage a project (SLO #17)					
Understand and apply the basic principles of sustainable construction (SLO #18)					
Understand and apply the basic principles of structural behavior (SLO #19)					
Understand and apply the basic principles of mechanical, electrical, and piping systems (SLO #20)					
General business understanding applied to managing a construction project					
Overall work preparedness including anticipation of the unforeseen					
Education foundation for potential promotion					

The following characteristics apply only to your experience/interaction with **Civil Engineering Technology (2-year degree)** graduates (This would likely be during a summer internship as most graduate with the Bachelor degree as well)					
	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Material Properties and Testing competence					
Highway Technology understanding and application competence					
Hydraulic Principles understanding and application competence					

The following characteristics apply only to your experience/interaction with **Building Construction Technology (2-year degree)** graduates (This would likely be during a summer internship as most graduate with the Bachelor degree as well)					
	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Field Engineering principles understanding and application competence					
Mechanical & Electrical Plans and System understanding and application competence					
Wood & Steel Framing principles understanding and application competence					

The following question applies to **ALL** program graduates.			
	Doubtful *	Likely	Definitely
Given the appropriate economic conditions in the construction industry, I would hire a Ferris State University graduate			
* Please comment:			

Based upon your experience with Ferris State University and possibly other universities with construction management programs, please answer the following:					
	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure / Unable to Answer
The program has an adequate number of faculty with required teaching and construction management experience					
The program's faculty have satisfactory academic credentials and experience					
The program's faculty have adequate Ferris institutional support for professional development and continuing education					
The program has adequate facilities including computer and practice laboratories					
The program receives adequate financial and leadership support from the university					
There is high demand for graduates from Ferris State University's construction program(s)					
The graduates of this program are competitive with graduates of similar programs at other universities					
The American Council for Construction Education (ACCE) accreditation is significant to the success of our hiring program and the Construction Management program					
The program's curriculum meets the needs of our company and the construction industry					
The program's curriculum is updated in a timely manner to accommodate new technologies					

In keeping with the program's desire to remain current with industry needs/trends, the following questions apply to our present thinking regarding course topics we are presently incorporating into our programs over the next year. We have recently (2017-2018 academic year) added classes to the overall curriculum in: Virtual Design and Construction; Mechanical Systems Practices; Electrical Systems Practices; Field Engineering for all graduates (not just the building side); and 400-level electives including (sustainability, power and process plant construction, and civil infrastructure)

We would appreciate your feedback on the following potential courses we are considering adding and their importance to your firm.

	Less Important to My Firm	Generally Support	Very Important to My Firm	Brief Comment
400-level targeted electives on such subjects as: Demolition, Healthcare Construction, Historical Preservation				
An organized program whereby the first two years of the CM program would apply toward a residential builder's license with perhaps an additional course outside of the program to complete the necessary 60 hours of pre-licensure education				

Finally, we would like to offer you the opportunity to comment on any aspect of the Ferris State University CONM, CETH, and BCTM educational programs. Please offer any comment that would be useful to our continuing quest to improve our effectiveness and quality.

Aspects of the FSU program that are particularly valuable to you including curricula content, faculty, and special programs	
Aspects of the FSU program that you believe could be strengthened or added to the program to yield a more effective FSU graduate	
Other comments	

Thank you for the time you have taken to complete this survey. Your viewpoints are very important to the College and our program. Please return the survey in the addressed, stamped envelope included in this mailing.

Ferris State University Senior Exit Survey

Dear Graduating Senior,

You are asked to complete the following survey as a requirement of our program to assess your educational outcomes. In addition, the program wishes to improve our performance and be responsive to student recruitment and needs - you can help us do so.

A portion of this survey will serve as an indirect assessment of our Bachelor of Science in Construction Management degree and Ferris State University and input to our accreditation reports with the American Council for Construction Education (ACCE). The remaining questions are for internal use by our program toward our continuous improvement process.

It will take approximately 20 minutes to complete the questionnaire. Your participation in this study is completely voluntary. There are no foreseeable risks associated with this survey. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Professor Hanna or Professor Miller.

Thank you very much for your time and support.

General Questions

1. With which gender do you identify?
   Male
   Female
   Prefer to not say

2. Are you a veteran?
   Yes
   No

3. Where did you go to high school? (name of school, city, state)

4. Did you attend a career tech center or take building construction courses in high school?
   Yes
   No

5. Did you change majors to construction management?
   Yes
   No

6. Were you a transfer student to Ferris?
   Yes
   No

7. If so, where school did you attend prior to Ferris?

8. What is your semester of graduation?
   - Fall
   - Spring

9. What is your year of graduation?

10. Do you have a minor or other Associate's or Bachelor degree?
    - Yes
    - No

    If yes, what is it?

Program Questions

The following questions relate to the 20 Student Learning Outcomes identified by the ACCE. Please use the scale of 1 (FSU did a Poor job) to 10 (FSU did an Outstanding job) to identify how well your education here at Ferris State University has prepared you for your perceived employment needs in that field.

The first set of SLOs begin with the word *Create*. **Create** is the highest level of learning. At this level students should be producing new ideas or products that integrate the knowledge they have gained. When students are involved in creating new artifacts, they are actively engaged in the subject matter.

SLO #1: Create written communication appropriate to the construction discipline

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #2: Create oral presentations appropriate to the construction discipline

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #3: Create a construction project safety plan

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #4: Create construction project cost estimates

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #5: Create construction project schedules

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

The next set of SLOs begin with the word *Analyze. Analyze* is a medium level of learning. At this level students should begin to develop higher order thinking. They may be asked to compare and contrast or take a concept and break it into parts to explore the relationships present.

SLO #6: Analyze professional decisions based on ethical principles

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #7: Analyze construction documents for planning and management of construction processes

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #8: Analyze methods, materials, and equipment used to construct projects

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

The next set of SLOs begin with the word Apply. Apply is a medium level of learning, just below Analyze. At this level, students begin to put the information they are learning into context. Here they are able to integrate ideas across multiple situations or utilize the content in a new way.

SLO #9: Apply construction management skills as a member of a multidisciplinary team

Poor — Outstanding

1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SLO #10: Apply electronic-based technology to manage the construction process

Poor — Outstanding

1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SLO #11: Apply basic surveying techniques for construction layout and control

Poor — Outstanding

1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

The final set of SLOs begin with the word *Understand. Understand* is a lower level of learning, just above the lowest level of Remember. At this level, students demonstrate that they understand the content by explaining, summarizing, classifying, or translating the given information.

SLO #12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process

Poor — Outstanding

1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SLO #13: Understand construction risk management

Poor — Outstanding

1 2 3 4 5 6 7 8 9 10

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

SLO #14: Understand construction accounting and cost control

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #15: Understand construction quality assurance and control

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #16: Understand construction project control processes

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #17: Understand the legal implications of contract, common, and regulatory law to manage a construction project

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #18: Understand the basic principles of sustainable construction

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #19: Understand the basic principles of structural behavior

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #20: Understand the basic principles of mechanical, electrical, and piping systems

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

11. Should there be more hands-on experiences in the program
    Yes
    No

    If so, in which classes?

12. Please list any topics you feel are missing/lacking in the program.

Post-Graduation Plans Questions

13. Are you continuing on to graduate school?
    Yes
    No

    If yes, what will you be studying?

14. Have you accepted a job offer?
    Yes
    No

15. If yes, what is the name of the company?

16. What type of work do they complete? (check all that apply)
    General Contracting
    Construction Management
    Civil – Bridges
    Civil – Roadways
    Civil – Utilities
    Specialty Contractor
    Design-Build
    Testing Agency
    County Road Commission
    MDOT

17. Where is their headquarters located?

18. What is your approximate starting salary?

19. What benefits are included with your job offer?

20. Will you be relocating outside of Michigan?
    Yes
    No

    If yes, where?

21. If you are relocating outside of Michigan, did you seek a position outside of the state? If not, what factor led you to accept a position outside of the state?

22. Did you find/meet this company at a Career Fair or evening presentation at the Granger building?
    Career Fair
    Evening Presentation
    Job Posting in the building

23. Did you work for this company in previous summers?
    Yes
    No

    If yes, how many summers?

24. Do you feel Ferris prepared you well to start your job with this company?
    Yes
    No

Granger Building Questions

25. Characterize the quality and maintenance of the program's lab equipment

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

26. Characterize the quality and maintenance of the program's lab classrooms

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

27. Please rate the physical quality of the program's classrooms
    - Excellent
    - Very Good
    - Good
    - Fair
    - Poor

Student Involvement Questions

28. Were you a member of the Associated Construction Students (ACS) group at any time?
    - Yes.
    - No

    If yes, did you hold a leadership position at any time?

29. Were you a member of Sigma Lambda Chi at any time?
    - Yes.
    - No

    If yes, did you hold a leadership position at any time?

30. Did you participate on a student competition team?
    - Yes
    - No

31. If you did participate on a student competition team, which one?
    - ASC – Commercial
    - ASC – Design-Build
    - ASC – Heavy Civil
    - ABC
    - Estimating competition

32. Did you work part time during the school year?
    - Yes
    - No

33. Did you take advantage of Sigma Lambda Chi's free tutoring services in the evening?
    - Yes, regularly
    - Yes, sometimes
    - No, never

Thank you for taking the time to complete this survey.

APPENDIX H

Assessment: Course Four Column

Z - BCTM Courses

BCTM ---:BCTM General Credit

No data found for the selected criteria.

BCTM 213:Wood-Steel Framing and Finish

BCTM 217:Virtual Design and Construction

BCTM 234:Electrical Construction Practices

BCTM 235:Mechanical Construction Practices

Assessment: Course Four Column

Z - CETM Courses

CETM ---:CETM General Credit

No data found for the selected criteria.

CETM 214:Adv Mat'ls Properties-Testing

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Analyze and blend aggregate for a HMA trial batch designed to meet Superpave sepcifications. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% success	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 89% Completion (05/23/2018)	
Outcome #2 - Compute and plot aggregate gradation blends on the FHWA .45 power chart. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% Average completion (05/23/2018)	
Outcome #3 - Test and identify aggregate properties that meet Superpave criteria. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 82% Average (05/23/2018)	
Outcome #4 - Compute HMA volumetrics and proposed mix designs, test HMA trial batches and compare test results to Superpave criteria. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% completion (05/23/2018)	

CETM 215:Construction Equipment-Operat

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Calculate the owning and operating cost of numerous pieces of construction equipment. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2016 - 2017 (Fall 2016), 2017 - 2018 (Fall 2017) **Start Date:** 05/01/2016 **End Date:** 05/01/2018	**Case Studies/Problem-based Assignments -** Student homework and exam problems **Criterion for Success:** Completion of problems with above 70%	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 95% successful completion (05/15/2018)	
Outcome #2 - Determine the equipment production rates for earthwork equipment, pavement equipment used on highway and bridge construction. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Exams and Homework problems **Criterion for Success:** Above 70% score	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 81% successful completion (05/15/2018)	

CETM 226:Highway Technology

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Perform the planning and design processes for highways. **Course Outcome Status:** Active	Exam and homework exercises **Criterion for Success:** 70% Completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 70% Completion (05/23/2018)	
Outcome #2 - Demonstrate the methods utilized by AASHTO for geometric and pavement design. **Course Outcome Status:** Active	Students are to do a semester project which includes designing a sag vertical curve including all associated geometric elements and quantities. **Criterion for Success:** 70% completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 82% Completion (05/23/2018)	
Outcome #3 - Draw road plans utilizing AutoCAD. **Course Outcome Status:** Active	Students draw road section elements on AutoCAD and create profile, cross section, and typical sections **Criterion for Success:** 70% completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% Completion (05/23/2018)	

CETM 227:Hydraulics and Hydrology

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Hydrostatic Pressure - Calculate hydrostatic pressures and resultant vector forces and their locations on submerged surfaces **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Complete calculations to determine the pressure on a submerged surface such as a gate or dam **Criterion for Success:** 70% of students will achieve a 70% or better score **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% of students achieved a 70% or better on these asignments (05/31/2018)	**Action:** No Action Required (05/31/2018)
Outcome #2 - Hydrodynamic Calculations - Perform hydrodynamic calculations on fluids in open and closed conduits (ACCE SLO #20) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Perform hydrodynamic calculations on fluids in open and closed conduits **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved a 70% or better (05/31/2018)	**Action:** No Action Required (05/31/2018)
Outcome #3 - Hydrologic Calculations - Perform hydrologic calculations on a watershed **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Perform hydrologic calculations on a watershed **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved 70% or better (06/01/2018)	**Action:** No Action Required (05/31/2018)
Outcome #4 - Hydraulic Methods - Understand hydraulic methods of storm water control **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Explain hydraulic methods of storm water control **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved a 70% or better (05/31/2018)	**Action:** No Action Required (05/31/2018)

CETM 230:MDOT Certification Preparation

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Upon completion of this course the student will be prepared to take the written and laboratory MDOT certifications in Aggregate, Bituminous, and Density Control. **Course Outcome Status:** Active			

CETM 327:Hydraulics and Hydrology

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Calculate the hydrostatic pressure as well as the resultant vector force and its locatioin on any submerged surface. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** Learning **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Successful completion of homework assignments. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 70% or higher on the assignment. (05/07/2018)	
Outcome #2 - Calculate the buoyant force on a submerged object. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Weekly assignments that involve written problem solving method. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94% of students scored 70% or higher. (05/07/2018)	
Outcome #3 - Perform calculations related to fluids in motion, including Bernoulli's Equation, pipe flow, flow measurement and open channel flow. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Weekly problem solving assignments **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 89% of students earned a score of 70% or higher. (05/07/2018)	
Outcome #4 - Calculate rainfall and watershed runoff from a tract of land based on the probability of a particular storm. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Written assignments of covered topics. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94% of students scored 70% or higher. (05/07/2018)	
Outcome #5 - Complete a comprehensive problem utilizing all the major components listed above. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Student will complete a comprehensive problem utilizing all major components above. **Criterion for Success:** 70% of students will achieve a score of 70% or greater **Assessment Schedule:** final project	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83% of students earned a score of 70% or higher. (05/07/2018)	

Course Outcomes	Assessment Methods	Results	Actions
	at the end of the semester		

Assessment: Course Four Column

Z - CONM Courses

CONM ---:CONM General Credit

No data found for the selected criteria.

CONM 100:Orien to Const Tech - Mgmt

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Connect with faculty and the university **Course Outcome Status:** Active	Each faculty member will make a short presentation to the CONM-100 students **Criterion for Success:** Role will be taken in the class	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Criterion Met Students signed the role sheet (03/30/2011)	
	Students are required to see their adviser **Criterion for Success:** Students will present a signed document from their adviser	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Criterion Met Students have returned the signed document (03/30/2011)	
Outcome #2 - Gaining a basic level of understanding about useful learning strategies. **Course Outcome Status:** Active	Students will participate in programs related to Time Management, Study Skills, Good Health Habits and Procrastination **Criterion for Success:** Students will participated in quizes/surveys to confirm their participation in the activity.		
Outcome #3 - Use campus and community resources along with a basic ability to determine when and how to access them **Course Outcome Status:** Active	Students are required to attend several activities on campus i.e. "Beer Booze and Books", "Sex and the College Student, ACS meeting, SLC meeting, "Test Taking Tips", etc. **Criterion for Success:** Students will present documentation that they attend these events.		
Outcome #4 - Understand issues surrounding personal health and social choices and accountability to self and community **Course Outcome Status:** Active	Students will participate in activities presented by "Good Choices", Educational and Career Counseling Center, Office Student Conduct Center, Library Services and Student Services **Criterion for Success:** Activities		

Course Outcomes	Assessment Methods	Results	Actions
	conclude with a survey/quiz that is collected and evaluated for participation		
Outcome #5 - Use academic advising and current campus technologies for learning, communication and registration **Course Outcome Status:** Active	Students will log into My Degree and check their current status. Students will compose a schedule for spring semester and present it to their adviser **Criterion for Success:** Students will return a signed document from their adviser		
Outcome #6 - Briefly describe the history of construction **Course Outcome Status:** Active			

CONM 111:Construction Practices

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Structural Layout - Apply methods of structural layout (ACCE 11). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **Start Date:** 12/15/2015	**Test - Internally Developed - Pre/Post or Post -** Students will be required to pass Test #1. Test #1 tests an understanding and application of basic construction math, vertical and horizontal measurement as applied to a benchmark and control points. Math is applied to elevation (design) information. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the Test #1. **Assessment Schedule:** During Spring Semester - Even years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% of the class passed Test#1 with a median grade of 76.9% (05/04/2018)	**Action:** No further action at this time. (08/14/2016)
Outcome #2 - Materials and Methods - Demonstrate an understanding of materials and methods of construction (ACCE 19). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Summer 2018) **Start Date:** 12/15/2015	**Test - Internally Developed - Pre/Post or Post -** Students will be required to pass Test #1. Test #1 tests an understanding and application of basic construction math, vertical and horizontal measurement as applied to a benchmark and control points. Math is applied to elevation (design) information. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the Test #1. **Assessment Schedule:** During Spring Semester - Even years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% of the class passed Test#1 with a median grade of 76.9% (05/04/2018)	**Action:** No action required (05/04/2018) **Action:** No further action at this time. (08/14/2016)
	Test - Internally Developed - Pre/Post or Post - 80% of the students will earn a passing grade on Test #2. Test #2 consists of masonry and concrete (including resteel) quantity takeoff. **Criterion for Success:** 80% of the	**Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 91% of the class passed Test#1 with a median grade of 82.9% (08/14/2016)	**Action:** No further action at this time. (08/14/2016)

Course Outcomes	Assessment Methods	Results	Actions
	students will earn a passing grade of 65% or better on the Test #2. **Assessment Schedule:** During Spring Semester - Even years		
Outcome #3 - Safety - Demonstrate basic crew safety (ACCE 01). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Summer 2018) **Start Date:** 01/15/2016	**Written Product (essay, research paper, journal, newsletter, etc.) -** Students will prepare a tool use safety presentation. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the tool use safety presentation. **Assessment Schedule:** Spring Semester - Even Years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the class earned a passing grade on the assignment with a median grade of 98.6%. (05/04/2018)	**Action:** No action required (05/04/2018)
Outcome #4 - Quantity Take-Offs - Prepare basic quantity take offs for materials. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017) **Start Date:** 12/15/2015	**Project/Model/Invention -** Students will prepare a detailed quantity take off of an assigned model building. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the quantity take off assignment. **Assessment Schedule:** Spring Semester - Even Years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the class earned a passing grade on the assignment with a median grade of 84.4%. (05/04/2018)	**Action:** No further action at this time. (05/04/2018)

CONM 112:Plans and Specifications

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Identify Plan Details - Identify specific dimensions, locations, installation, and material requirements on project plans and specifications. (ACCE SLO #7) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed - Pre/Post or Post -** Final Exam **Criterion for Success:** 70% will receive a 70% or greater on the final exam **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% achieved a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Basic QTO - Perform very basic quantity takeoffs from commercial and industrial construction plans **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed - Pre/Post or Post -** Final Exam - basic quantity takeoff from supplied drawings **Criterion for Success:** 70% of students will receive a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% achieved a 70% or better (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Road and Bridge Construction - Identify the components of road and bridge construction **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed - Pre/Post or Post -** Final Exam - portion dedicated to road and bridge construction - identify components from drawings **Criterion for Success:** 70% of students will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 70% achieved 70% or better on the final exam portion dedicated to bridges and road construction (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Explain the design process and how plans and specifications are intricately related **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed - Pre/Post or Post -** Midterm - describe the process steps from the Owner's concept to construction start **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Inconclusive Did not test for this outcome (06/01/2018)	**Action:** Add topic to midterm or final exam (05/25/2018)
Outcome #5 - Architectural and Engineering Scales - Accurately read an architectural and engineering scale **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Lab-based exercises in class reading lines at different architectural and engineering scales	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% could accurately read architectural and engineering scales (05/21/2018)	**Action:** No Action Required (06/01/2018)

Course Outcomes	Assessment Methods	Results	Actions
Planned Semester(s) of Assessment: 2017 - 2018 (Fall 2017)	**Criterion for Success:** 100% will achieve 100% on the in-class lab assignment **Assessment Schedule:** yearly		

CONM 116:Construction Graphics

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - 2D - Demonstrate basic graphic comminucation skills to communicate spontaneously with the client, supervisors and the various crafts in two dimensions (ACCE SLO #1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Project/Model/Invention -** Final project - student will design and hand draft floor plan, elevation, and an isometric **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** once a semester	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 81% achieved a 70% or greater (05/21/2018) **Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 83% achieved a 70% or better (05/21/2018) **Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87.5% achieved a 70% or greater on the final (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Three-Dimensional Skills - Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in three dimensions. (ACCE SLO#1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Project/Model/Invention -** Final project - student will create a three-dimensional model on the computer of their final project **Criterion for Success:** 70% will receive a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% achieved a 70% or greater on their model (05/21/2018) **Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 81% achieved a 70% or greater (05/21/2018) **Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 78% received a 70% or greater (05/21/2018)	**Action:** No Action Required (05/25/2018)

CONM 117:Construction Building Inf Tec

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Office Software - Demonstrate word processing, spreadsheet, and presentation software proficiency on a variety of assignments typical in the construction industry. (ACCE SLO #1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Test - Internally Developed - Pre/Post or Post -** Midterm exam to create or manipulate word processing, spreadsheets, and presentation software **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% received a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or higher (05/21/2018)	
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 91.5% received a 70% or higher (05/21/2018)	
Outcome #2 - Building Information Technology (BIT) - Explain how Building Information Technology (BIT) is used in the industry and the processes that make up BIT as they apply to information in a company that uses BIT techniques (ACCE SLO #10) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Test - Internally Developed - Pre/Post or Post -** Final exam - Explain how BIM is used in the industry **Criterion for Success:** 70 % will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% achieved a 70% or better (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or better (05/21/2018)	
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 80% received a 70% or better (05/21/2018)	
Outcome #3 - Building Information Modeling (BIM) - Create and modify basic multi-dimensional Building Information Technology models with Civil, Architecture, and Structure (ACCE SLO #10) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Project/Model/Invention -** Building Study project that uses plans and specifications from CONM 112 and includes sitework, architecture, and structural components **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 74% received a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Not Met 50% received a 70% or higher. Several did not submit project (05/21/2018)	**Action:** Keep daily assignments for project up to date in Blackboard for student access. Assess student work each day in class to ensure they are keeping up (05/07/2016)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or better on their project (05/21/2018)	

CONM 121:Materials Properties-Testing

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Properties - Describe the properties of construction materials. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Determine the properties/characteristics of various construction materials **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** 3 Tests Per Semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% of the students received a 70% or greater on all three tests. (05/07/2018)	**Action:** No action needed. (05/07/2018)
Outcome #2 - Testing (ACCE SLO #8) - Demonstrate an understanding of material properties through industry-standard testing. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Solve problems based on construction material properties **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** 3 Tests per Semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% of the students received a 70% or greater on all three tests. (05/07/2018)	**Action:** No action needed. (05/07/2018)
Outcome #3 Lab Report (ACCE SLO #1) - Create formal written laboratory reports. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Generate lab reports for appropriate tests conducted during labs **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** Minimum of two formal lab reports required per semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83% of the students received a 70% or greater on all formal lab reports. (05/07/2018)	**Action:** No action required. (05/07/2018)

CONM 122:Const Surveying-Layout

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Field measurement data - The learner will be able to accurately measure and record surveying field data. ACCE #11 **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the assignment. (12/16/2016)	**Action:** None needed at this time. (12/16/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 89% of students accomplished a score of 70% or better on the assignment. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 78% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Outcome #2 - Construction layout data - The learner will be able to accurately calculate and layout construction surveying data. ACCE#11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or greater on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 93% of the students accomplished a score of 70% or greater on the assignment. (12/16/2016)	**Action:** None needed at this time. (12/16/2016)

Course Outcomes	Assessment Methods	Results	Actions
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 82% of the students accomplished a score of 70% or greater on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 89% of the students accomplished a score of 70% or better on the assignment. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 75% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)

CONM 211:Construction Estimating 1

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Estimating Data - Obtain estimating data from industry sources. (ACCE SLO#4) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment - Use RS Means to procure unit costs, city indexes, and crew information **Criterion for Success:** 70% of students will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 75% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Quantity Takeoff - Perform quantity takeoffs utilizing contract documents. (ACCE SLO#4) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Examination - Complete various quantity takeoffs **Criterion for Success:** 70% shall achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84.4% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Proposal - Complete a bid proposal. (ACCE SLO#4)	**Test - Internally Developed - Pre/Post or Post -** Examination - Fill out a bid proposal **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Actions Required (05/25/2018)
Technology - Utilize technology to complete bid estimates. (ACCE SLO#4, ACCE SLO#10) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment - Create an estimate using computer software **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93.8% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Ethics - Discuss ethical issues in bidding. (ACCE SLO#6) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87.5% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 212:Soils and Foundations

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Soil/Water Interaction - Recognize the interaction between water and soil. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify expected behavior when different soils are exposed to water **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #2 - Bearing Capacity - Calculate soil bearing capacity (ACCE SLO #8) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Calculate soil bearing capacity **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #3 - Compaction - Identify the elements of soil compaction. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify different methods of soil compaction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #4 - Soil Characteristics - Identify soil characteristics using field and laboratory techniques. **Course Outcome Status:** Active	**Observations (e.g. Clinical or Field) -** Identify soil characteristics in the lab **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #5 - Design - Understand principles of foundation design an analysis (ACCE SLO #19) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Determine required foundation sizes given certain soil parameters and characteristics **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		

CONM 221:Statics and Structures

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Static Equilibrium - Understand equilibrium, free body diagrams, and vector analysis. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - draw a free body diagram to explain structural forces **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given during the semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)
Outcome #2 - Structures - Apply the concepts of equilibrium and free body diagrams to the analysis and design of basic structural elements. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Develop equations of static equilibrium for different forces **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given over the semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)
Outcome #3 - Materials (ACCE SLO #19) - Apply structural analysis and design using wood and metals. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given per semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)

CONM 222:Construction Administration

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Delivery Systems - Understand construction delivery systems. (ACCE SLO #12) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CRO - Complete an organization chart for a CM using a specific type of contract; identify the trade worker with the worker description provided by BLS **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83.3% students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Scheduling - Understand basic elements of construction scheduling. (ACCE SLO #5) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment PPA - Identify different scheduling methods, define scheduling terms, estimate the duration of given activities **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 91.7% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Documentation - Create basic construction documentation. (ACCE SLO #7) **Course Outcome Status:** Active	**Certification Exam -** PROC Assignment - Complete the Procore Project Manager Core Tools certificate and one of the following: Project Management; Quality & Safety; Superintendent; Engineer; Subcontractor **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 91.7% of students scored 75% or better. (05/24/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Quality - Understand the requirements of delivering a construction project based on time, cost and quality. (ACCE SLO #14, ACCE SLO #15) **Course Outcome Status:** Active	**Certification Exam -** Assignment PROC (Project Manager – Quality & Safety segment) **Criterion for Success:** 75% of students score 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81.3% of students scored 75% or better (05/07/2018)	**Action:** No Actions Required (05/25/2018)
	Case Studies/Problem-based	**Reporting Period:** 2017 - 2018	**Action:** No Action Required

Course Outcomes	Assessment Methods	Results	Actions
	Assignments - Assignment PRC **Criterion for Success:** 75% of students score 75% or better	**Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	(05/25/2018)
Outcome #5 - Changes in Construction - Understand the nature of changes to the construction process. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CHG ORD **Criterion for Success:** 75% of students score 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93.8% of students scored 75% or better (05/24/2018)	**Action:** No Action Required (05/25/2018)

CONM 225:Field Engineering

Course Outcomes	Assessment Methods	Results	Actions
Soil erosion - Examine site erosion and storm water control. ACCE #7 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Internal exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% of better on the exam. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the exam. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 73% of the students accomplished a score of 70% or better on the exam. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 82% of the students accomplished a score of 70% or better on the exam. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Project controls - Examine codes, ordinance, regulations, and operations documentation. ACCE #7 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Internal exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the exam. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Not Met 59% of the students accomplished a score of 70% or better on the exam. (12/09/2016)	**Action:** Review exam to verify clarity and intent of exam questions. (12/09/2016) **Follow-Up:** Revised exam

Course Outcomes	Assessment Methods	Results	Actions
			questions to better relate material covered in the course to the intent of the exam questions. (02/14/2018)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 81% of the students accomplished a score of 70% or better on the exam. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the exam. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Filed measurement data - Accurately establish and calculate horizontal and vertical control points for construction layout. ACCE #11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93% of the students accomplished a score 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 92% of the students accomplished a score of 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the assignment. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 98% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 94 % of the students accomplished a score of 70% or better on the assignment. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met	**Action:** None needed at this time. (05/15/2015)

Course Outcomes	Assessment Methods	Results	Actions
		100% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	
Construction layout data - Accurately calculate and perform construction layout. ACCE #11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or greater on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Not Met 69% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** Score below minimum criteria set was due to students not completing all of the assignment. No action is needed at this time. (03/21/2018) **Follow-Up:** Removing scores of zero for non complete work, raised the average grade to above the minimum criteria. Confirmed that no action is needed at this time. (01/19/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 98% of the students accomplished a score of 70% or better on the assignment. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)

CONM 311:Formwork-Temp Structures

Course Outcomes	Assessment Methods	Results	Actions
Temporary Loads - Calculate basic loads and forces on temporary structures. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework # 2 **Criterion for Success:** 70% of students will accomplish a score of 70% or better **Assessment Schedule:** once an academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 80% of students accomplished a score of 70% or better (12/09/2016)	**Action:** None required (12/09/2016)
Rigging - Recognize the major elements of construction rigging. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test **Criterion for Success:** 70% of students receive a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
Materials and Methods (ACCE SLO #8) - Identify the most common materials and methods used in concrete installation. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Project assignment # 2 **Criterion for Success:** 70% students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 92% students scored 70% or better (12/09/2016)	**Action:** None required (12/09/2016)
Design Loads - Calculate design loads and pressures in formwork applications. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Test and Formwork Project **Criterion for Success:** 70% of students will receive a 70% grade or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
Design (ACCE SLO #8 & #19) - Select formwork members from applied loads and pressures.	**Written Product (essay, research paper, journal, newsletter, etc.) -** Project assignment # 2	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the	**Action:** No action required. (05/07/2018)

Course Outcomes	Assessment Methods	Results	Actions
Course Outcome Status: Active	**Criterion for Success:** 70% of students accomplish 70% or better **Assessment Schedule:** once per academic year	Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	

CONM 312:Construction Scheduling

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Activities - Develop an activity listing and corresponding duration for a construction project. (ACCE SLO #5) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment ADAD **Criterion for Success:** 75% of students will obtain 75% or better **Assessment Schedule:** Every term	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Not Met 55.5% students scored 75% or better. (05/07/2018)	**Action:** Increase emphasis how to break down activities and estimate duration. (05/07/2018)
Outcome #2 - Schedule - Develop a construction schedule both manually and electronically. (ACCE SLO #5, ACCE SLO #10) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment NCP6 **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Resources - Perform a resource allocation on a schedule. (ACCE SLO#16) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment RPS **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 77.8% of students scored 75% or better. (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Cost Loading - Calculate activity values and cost load the corresponding schedule. (ACCE SLO#14, ACCE SLO#16) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CPS **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94.4% scored 75% or better. (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #5 - Final Schedule - Present a finalized construction schedule. (ACCE SLO #5) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Examination FE **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 321:Construction Cost Estimating

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Conceptual - Develop conceptual estimates using various methods. (ACCE SLO #4) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97.0% scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Impacting Factors - Analyze factors that impact unit costs and productivity. (ACCE SLO #8) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 78.8% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Overhead and Profit - Describe overhead allocation and profit determination. (ACCE SLO #14) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Cost Control - Understand construction cost control. (ACCE SLO #14) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #5 - Statistics - Understand basic statistical techniques. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 324:Adv Const Computer Techniques

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Software in Construction Operations - Demonstrate proficiency in the use of software application used in construction operations (ACCE SLO# 4, 10) **Course Outcome Status:** Active	Excel project to demonstrate mastery of an estimating program **Criterion for Success:** Mean average grade 80%	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87% of students achieved a score of 70% or more (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2011 - 2012 and Prior **Classification:** Criterion Met 81% (04/18/2011)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Demonstrate advanced capabilities in Microsoft Office products (Excel ,Word, PowerPoint) to include linking and embedding across various programs. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 87% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
Outcome #2 - Application of Industry-specific Technologies - Apply a variety of construction industry-specific technologies to construction projects (ACCE SLO# 4, 10) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Utilize construction specific software to perform take-offs of earthwork related activities. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Utilize construction specific software to perform take-offs of building components **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	

Course Outcomes	Assessment Methods	Results	Actions
	Case Studies/Problem-based Assignments - Utilize construction specific software to integrate schedules with 4D software. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Utilize construction specific software to coordinate 3D models between various stakeholders and improve construction efficiency and communication. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93% of students achieved a score of 70% or better (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater (05/07/2018)	
	Case Studies/Problem-based Assignments - Utilize construction specific software to complete 5D take-offs of model based projects. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
Outcome #3 - Field Software and Technology - Demonstrate the use of advanced field software and technology applications **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Through the use of two tests determine advanced field technology understanding and application. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students scored a 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)

CONM 373:Professionalism & Ethics in Construction

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Theories of Ethics - Evaluate the major theories of ethics **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Professional Codes - Understand professional codes of ethics **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Ehics skills for the industry - Develop leadership and ethical project management skills for the construction industry **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Ethical dilemmas - Develop personal skills for facing ethical dilemmas (ACCE SLO #6) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)	**Written Product (essay, research paper, journal, newsletter, etc.) -** Interview with a construction professional regarding ethical situations typical to construction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		

CONM 412:Construction Contracts

Course Outcomes	Assessment Methods	Results	Actions
Documents - Compare and contrast the standard documents used in the construction industry. ACCE #12 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 94% of the students accomplished a score of 70% or greater on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
Procedures - Interpret administrative procedures required by the contract documents. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** test	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 97% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
Law - Application of general business law as it applies to the construction industry. ACCE #17 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 84% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 93% of the students accomplished a score of 70% or better	**Action:** None needed at this time. (05/13/2016)

Course Outcomes	Assessment Methods	Results	Actions
		on the quiz. (05/13/2016)	
Risk - Evaluate inherent contractual risk. ACCE #13 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)

CONM 413:Construction Economics

Course Outcomes	Assessment Methods	Results	Actions
Alternative Selection - Perform comparative analysis using common techniques of "Engineering Economic Analysis". **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2015 - 2016 (Fall 2015) **Start Date:** 08/31/2015	**Test - Internally Developed - Pre/Post or Post -** Test No. 3: Net Present Worth and Annual Cash Flow Analysis **Criterion for Success:** 90% of students shall score 65% or better. **Assessment Schedule:** Course Reporting Champion: John Schmidt. Every third semester beginning with Fall 2015.	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the exam. (05/19/2017)	**Action:** None needed at this time. (05/19/2017)
	Test - Internally Developed - Pre/Post or Post - Exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2013 - 2014 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (05/16/2014)	**Action:** None needed at this time. (05/16/2014)

CONM 424:Const Supervision-Safety

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 Application - Analyze the application of safety management in the construction industry **Course Outcome Status:** Active	**Presentation (Oral) -** Present a pre-approved safety topic to the class. 10 minute presentation **Criterion for Success:** 70% of the students will achieve a score of 70% or better **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students achieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)
	Test - Internally Developed - Pre/Post or Post - Evaluate methods of correcting safety hazards on a construction site **Criterion for Success:** 70% of students will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% achieved a 70% or better (06/01/2018)	
Outcome #2 Safety Plan - Develop a Site Specific Safety Plan (ACCE SLO #3) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 12/15/2017	**Written Product (essay, research paper, journal, newsletter, etc.) -** Student groups utilize a set of construction plans and specifications to analyze and develop a Site Specific Safety Plan. Each group approaches the project as an assigned sub contractor (e.g, masonry, concrete, steel, etc.) **Criterion for Success:** 70% of the students groups will receive a score of 70% or better **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students achieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)
Outcome #3 Safety Ethics - Evaluate ethical conduct based upon the situation (ACCE SLO #6) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Analyze a current case study highlighting ethical issues regarding safety. **Criterion for Success:** 70% of the students will receive a score of 70% or better. **Assessment Schedule:** Every	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students recieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)

Course Outcomes	Assessment Methods	Results	Actions
	semester		
Curriculum Revision - Revise the course to meet the requirements set forth by the Advisory Committee **Course Outcome Status:** No Longer an Outcome **Planned Semester(s) of Assessment:** Other **Start Date:** 04/01/2015	**Focus group -** prepare and submit the proper curriculum change forms to submit to the school, college and university curriculum committee **Criterion for Success:** the proposal is submitted and approved by all committees. **Assessment Schedule:** submission to school committee, then forwarded to the college curriculum committee, then forwarded to the university committe for final approval	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Inconclusive Curriculum proposal was submitted to College Curriculum Committee (03/22/2012) **Curriculum Change:** Requires UCC Approval	**Action:** If approval is met by the College Curriculum Committee than that proposal will be submitted to the University Curriculum for final approval. (03/21/2012)

CONM 460:Current Topics in Construction Management

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Significance - Explain the significance of the current topic within the construction industry **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a three page paper investigating a current topic in the construction industry. **Criterion for Success:** 70% of students will achieve a score of 70% or better		
Outcome #2 - Ethics - Analyze any ethical conduct concerns with the current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Evaluate the proper ethical conduct based upon case study situations taken from sample cases provided by industry **Criterion for Success:** 70% of students will achieve a score of 70% or better		
Outcome #3 - Unique Methods - Identify any unique methods or costs associated with this current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Review a case study regarding a unique method and answer a set of ten questions. **Criterion for Success:** 70% of students will achieve a score of 70% or better		

CONM 461:Sustainability in Construction

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Significance - Explain and apply basic principles of sustainable construction (ACCE SLO #18) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a three page paper investigating a sustainability issue **Criterion for Success:** 70% of students will achieve a score of 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% achieved 70% or better (05/08/2018)	**Action:** No Action Required (05/08/2018)
Outcome #2 - Ethics - Analyze any ethical conduct concerns with the current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Evaluate the proper ethical conduct based upon case study situations **Criterion for Success:** 70% of students will achieve a score of 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 92% achieved 70% or better (05/08/2018)	**Action:** No Action Required (06/01/2018)
Outcome #3 - Unique Methods - Explain/identify the different methods of rating sustainable building practices (ACCE SLO #18) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Review a case study regarding a unique method and answer a set of ten questions **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87% achieved a 70% or better (05/08/2018)	**Action:** No Action Required (05/08/2018)

CONNM 462:Power and Process Plant Construciton

Course Outcomes	Assessment Methods	Results	Actions
Project Characteristics - Describe the characteristics and components for construction of large plant facilities **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Energy Sources - Understand basic sources of energy and types of power generation and process plants **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Engineering Principles - Identify basic plant engineering principles **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Site Plan - Develop a large sscale site plan and project management plan **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Test - Internally Developed - Pre/Post or Post -** Project site and management plan in test format **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of students scored 70% or better (05/07/2018)	**Action:** none rerquired (05/07/2018)

CONM 463 :Infrastructure Construction

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 Design - Understand basic civil engineering design and construction for construction infrastructure **Course Outcome Status:** Active			
Outcome #2 - Documents - Review construction and design documents as part of construction planning **Course Outcome Status:** Active			
Outcome #3 - Materials and Methods - Understand major materials and construction methods used in infrastructure construction **Course Outcome Status:** Active			
Outcome #4 - Structural Behavior - Understand the basic elements of structural behavior in civil construction (ACCE SLO #19) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Analyze structural behavior of infrastructure construction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #5 - MEP - Understand the basic principles of mechanical, electrical, piping and plumbing planning. (ACCE SLO #20) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Describe the main components of MEP systems in civil projects **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		

CONM 499:Construction Project Mgmt

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Project Management - Understand the concepts of project management in the construction industry (ACCE SLO #7, 12) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Final Exam **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of students scored 70% or better (05/04/2018)	
	Test - Internally Developed - Pre/Post or Post - Analyze construction documents for planning and management of construction processes **Criterion for Success:** 70% will achieve a 70% or greater		
	Test - Internally Developed - Pre/Post or Post - Identify roles, responsibilities, and relationships of project delivery methods **Criterion for Success:** 70% will achieve a 70% or greater		
Outcome #4 - Presentation - Successfully present student team work to faculty and industry representatives (SLO #1, 2, 9) **Course Outcome Status:** Active	**Presentation (Oral) -** Student team presentation **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of student teams scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
	Written Product (essay, research paper, journal, newsletter, etc.) - Create technical memoranda on student team project **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Each team member shall evaluate the teamwork performance of their		

Course Outcomes	Assessment Methods	Results	Actions
	own team members **Criterion for Success:** 70% shall achieve a 70% or greater **Assessment Schedule:** yearly		
Outcome #2 - Ethical Integration - Integrate technical, business, and ethical concerns in a project context. (ACCE SLO #6, 13) **Course Outcome Status:** Active	**Presentation (Oral) -** Student team presentation **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per year academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of student teams scored 70% or better (05/07/2018)	
	Test - Internally Developed - Pre/Post or Post - Evaluate construction industry ethical case studies **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		
	Test - Internally Developed - Pre/Post or Post - Explain/identify basic elements of risk analysis **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		
Outcome #3 - Submittals - Create professional construction management submittals from construction project documents (ACCE SLO #3, 4, 5, 9, 15, 16) - safety plan, estimate, schedule, team member evaluation, QA/QC, project control process	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a portion of a project safety plan for a construction project **Criterion for Success:** 70% will achieve a 70% or better		
	Written Product (essay, research paper, journal, newsletter, etc.) - Prepare a project cost estimate as part of a student team **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Prepare a project schedule as part of		

Course Outcomes	Assessment Methods	Results	Actions
	a student team **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly **Written Product (essay, research paper, journal, newsletter, etc.) -** Each team member is evaluated by the other team members for their participation in teamwork activities **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Complete a project QA/QC plan as part of the student team project **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Test - Internally Developed - Pre/Post or Post - Identify project control techniques **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		

APPENDIX I

Teaching Credentials For Each Course Applicable to the Higher Learning Commission's Requirements for Teaching at a Post-Secondary Institution

The Higher Learning Commission "expects that accredited institutions will use credentials as the primary mechanism to ascertain minimal faculty qualifications. HLC recognizes that experience may also be considered in determining faculty qualifications."

"Faculty teaching in higher education institutions should have completed a program of study in the discipline of subfield (as applicable) in which they teach, and/or for which they develop curricula, with coursework at least one level above that of the courses being taught or developed."

"Tested experience may substitute for an earned credential or portions thereof…an institution to determine that a faculty member is qualified based on experience that the institution determines is equivalent to the degree it would otherwise require for a faculty position. This experience should be tested experience in that it includes a breadth and depth of experience outside of the classroom in real-world situations relevant to the discipline in which the faculty member would be teaching." ("Determining Qualified Faculty Through HLC's Criteria for Accreditation and Assumed Practices" – March 2016)

Thus, the following criteria were developed for teaching each class within the program. The criteria are applicable to full-time, part-time, and adjunct faculty.

1. CONM 111: Construction Practices
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with any applicable industry-recognized certifications
                a. Experience pertinent to the class: majority of practical full-time experience spent in field supervision in the US commercial/industrial/heavy civil construction industry

2. CONM 112: Plans and Specs
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Architecture, Architectural Engineering, or equivalent + 8 years full time, practical in the US commercial/industrial/heavy civil construction/design industry
                a. Experience pertinent to the class: Plans and Specs class(es) in post-secondary education or working with construction documents on a regular basis
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Architecture, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry

3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with the majority spent working with drawings and specifications
    a. Experience pertinent to the class: Plans and Specs class(es) in post-secondary education OR working directly with construction documents on a regular basis

3. CONM 116: Construction Graphics
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Architecture, Architectural Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil/design construction industry
                a. Experience pertinent to the class: Drafting orthographics and isometrics, model-making
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Architecture, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry
                a. Experience pertinent to the class: Drafting orthographics and isometrics, model-making
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry working daily with drawings
                a. Experience pertinent to the class: Drafting orthographics and isometrics, model-making

4. CONM 117: Construction Building Information Technology
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Architecture, Architectural Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil/design construction industry
                a. Experience pertinent to the class: 3D Modeling class(s) in post-secondary education OR working with three-dimensional software on buildings and structures OR applicable industry-recognized certifications in 3D modeling
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Architecture, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry
                a. Experience pertinent to the class: 3D Modeling class(s) in post-secondary education OR working with three-dimensional software on buildings and structures OR applicable industry-recognized certifications in 3D modeling
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with applicable industry-recognized certifications or licenses for completing three-dimensional modeling
                a. Experience pertinent to the class: Working with three-dimensional software on buildings and structures for several years

5. CONM 121: Materials Properties & Testing
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry
                a. Experience pertinent to the class: Materials class(s) in post-secondary education OR materials testing and analysis
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry
                a. Experience pertinent to the class: Materials class(s) in post-secondary education OR materials testing and analysis
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry with appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: Materials class(s) in post-secondary education OR materials testing and analysis

6. CONM 122: Construction Surveying & Layout
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Surveying or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry
                a. Experience pertinent to the class: Surveying course(s) in post-secondary education OR 2 years practical US surveying and field layout experience
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Architecture, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry
                a. Experience pertinent to the class: Surveying course in post-secondary education OR practical US surveying and field layout experience
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry with appropriate industry-recognized certifications/licenses or National Society of Professional Surveyors – Certified Survey Technician Level IV certification
                a. Experience pertinent to the class: 5 years practical US surveying and field layout experience

7. CONM 211: Construction Estimating I
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Architecture, Architectural Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Architecture, or equivalent + 5 years full time in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses

a. Experience pertinent to the class: At least 5 years full time estimating US construction projects

8. CONM 212: Soils & Foundations
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/design/testing industry
                a. Experience pertinent to the class: Soils course(s) in post-secondary education OR geotechnical testing and analysis
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design/testing industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design/testing industry with appropriate industry certifications/licenses
                a. Experience pertinent to the class: Soils course(s) in post-secondary education OR geotechnical testing and analysis
9. CONM 221: Statics & Structures
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Statics course(s) in post-secondary education OR responsibility for structural design and analysis
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry certifications/licenses
                a. Experience pertinent to the class: Statics course(s) in post-secondary education OR responsibility for structural design and analysis for 4 years

10. CONM 222: Construction Administration
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Construction Administration course(s) in post-secondary education OR 5 years with project management responsibility
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications or licenses

a. Experience pertinent to the class: Construction Administration course(s) in post-secondary education OR 5 years with project management responsibility

11. CONM 225: Field Engineering
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Surveying or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry
                a. Experience pertinent to the class: Surveying/Field Engineering course in post-secondary education OR 3 years US surveying and field layout experience
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Surveying or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/surveying industry with appropriate industry certifications/licenses
                a. Experience pertinent to the class: 5 years US surveying and field layout experience

12. BCTM 213: Wood & Steel Framing and Finishes
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Class in post-secondary education OR majority of work experience spent framing structures
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses/journeyman status
                a. Experience pertinent to the class: Majority of work experience spent framing structures

13. BCTM 217: Virtual Design and Construction
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: VDC course in post-secondary education OR industry-recognized certifications OR responsibility for project coordination with multi-dimensional building models
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry

3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications.
    a. Experience pertinent to the class: responsibility for project coordination with multi-dimensional building models

14. BCTM 235: Mechanical Construction Practices
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Mechanical systems class in post-secondary education OR participation in or responsibility for mechanical systems installation for majority of work experience
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: participation in or responsibility for mechanical systems installation for majority of work experience

15. BCTM 234: Electrical Construction Practices
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Electrical systems class in post-secondary education OR participation in or responsibility for mechanical systems installation for majority of work experience
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: participation in or responsibility for electrical systems installation for majority of work experience

16. CETM 214: Advanced Materials Properties & Testing
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry

a. Experience pertinent to the class: Materials class in post-secondary education OR industry-recognized certifications OR materials testing and analysis for majority of work experience

2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry
3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/testing industry with appropriate industry-recognized certifications
   a. Experience pertinent to the class: materials testing and analysis for majority of work experience

17. CETM 215: Construction Equipment & Operations
    a. Degree Required: Bachelor of Science
       i. Must meet any of the following:
          1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
             a. Experience pertinent to the class: Construction equipment course in post-secondary education OR primary responsibility for a fleet of construction equipment for majority of work experience
          2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
          3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses
             a. Experience pertinent to the class: primary responsibility for a fleet of construction equipment for majority of work experience

18. CETM 227: Hydraulics & Hydrology
    a. Degree Required: Bachelor of Science
       i. Must meet any of the following:
          1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry
             a. Experience pertinent to the class: Hydraulics course in post-secondary education OR piping design and installation for majority of work experience
          2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry
          3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with appropriate industry-recognized certifications/licenses
             a. Experience pertinent to the class: piping design and installation for majority of work experience

Teaching Credentials for BCTM, CETM, and CONM Courses Effective Fall 2018

Teaching Credentials for BCTM, CETM, and CONM Courses Effective Fall 2018

19. CONM 311: Formwork and temporary Structures
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with increasing responsibility
                a. Experience pertinent to the class: Statics/Structures course in post-secondary education OR primary responsibility for designing temporary structures
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with increasing responsibility
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with appropriate industry-recognized certifications/licenses with increasing responsibility
                a. Experience pertinent to the class: primary responsibility for designing temporary structures for majority of work experience

20. CONM 312: Construction Scheduling
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: Scheduling course in post-secondary education OR 3 years responsibility scheduling projects and working with scheduling software
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: 5 years responsibility for scheduling projects and working with scheduling software

21. CONM 321: Construction Estimating II
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: 3 years responsibility for estimating projects and working with estimating software
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry

3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
    a. Experience pertinent to the class: 5 years responsibility for estimating projects and working with estimating software

22. CONM 324: Advanced Construction Computer Techniques and Technology
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: 3 years working with industry-appropriate software for project management, estimating, and general advanced construction technology applications
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses with increasing responsibility
                a. Experience pertinent to the class: 5 years working with industry-appropriate software for project management, estimating, and general advanced construction technology applications

23. CONM 373: Ethics and Professionalism in Construction
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: work that requires adherence to a faculty-accepted professional code of ethics
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses with increasing responsibility
                a. Experience pertinent to the class: work that requires adherence to a faculty-accepted professional code of ethics

24. CONM 412: Construction Contracts
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility

a. Experience pertinent to the class: 2 years writing and working with commercial/industrial/heavy civil construction contracts
2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry
3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/design industry with appropriate industry-recognized certifications/licenses or JD
    a. Experience pertinent to the class: 5 years writing and working with commercial/industrial/heavy civil construction contracts

25. CONM 413: Construction Economics
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction/engineering industry with increasing responsibility
                a. Experience pertinent to the class: responsibility for managerial monetary decisions
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Business Administration, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction/engineering industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction/engineering industry with increasing responsibility and with appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: responsibility for managerial monetary decisions

CONM 424: Construction Safety and Management

b. Degree Required: Bachelor of Science
    i. Must meet any of the following:
        1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
            a. Experience pertinent to the class: 2 years full time responsibility for safety on commercial/industrial/heavy civil construction projects
        2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
        3. Experience: 13 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
            a. Experience pertinent to the class: 5 years full time responsibility for safety on commercial/industrial/heavy civil construction projects

26. CONM 460: Current Topics in Construction Management
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent appropriate to the topic being taught + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: 3 years full-time in a supervisory or management role on commercial/industrial/civil projects applicable to the topic being taught
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent appropriate to the topic being taught + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses with increasing responsibility
                a. Experience pertinent to the class: 5 years full-time in a supervisory or management role on commercial/industrial/civil projects applicable to the topic being taught

27. CONM 461: Sustainability in Construction
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: Post-secondary education course in sustainability + applied experience working with commercial or industrial sustainable projects
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: 5 years applied experience working with commercial/industrial sustainable projects

28. CONM 462: Power and Process Plant Construction
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering or equivalent + 8 years full time, practical, experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: supervisory and/or managerial responsibility for power or process plant construction
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering

or equivalent + 5 years full time, practical, experience in the US commercial/industrial/heavy civil construction industry
3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
    a. Experience pertinent to the class: supervisory and/or managerial responsibility for power or process plant construction

29. CONM 463: Infrastructure Construction
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: supervisory and/or managerial responsibility for infrastructure projects
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with appropriate industry-recognized certifications/licenses with increasing responsibility
                a. Experience pertinent to the class: supervisory and/or managerial responsibility for infrastructure projects

30. CONM 499: Construction Project Management
    a. Degree Required: Bachelor of Science
        i. Must meet any of the following:
            1. BS in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 8 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility
                a. Experience pertinent to the class: Primary responsibility for managing construction projects for 3 years
            2. Master's in Construction Management, Construction Engineering, Civil Engineering, or equivalent + 5 years full time, practical experience in the US commercial/industrial/heavy civil construction industry
                a. Experience pertinent to the class: Primary responsibility for managing construction projects for 2 years
            3. Experience: 10 years full time, practical experience in the US commercial/industrial/heavy civil construction industry with increasing responsibility and appropriate industry-recognized certifications/licenses
                a. Experience pertinent to the class: Primary responsibility for managing construction projects for 6 years

APPENDIX J

FACULTY TEACHING LOADS 2017 - 2018

FALL 2017

FACULTY MEMBER	COURSE #	CREDITS	CONTACT HOURS	LECTURE HOURS	LAB HOURS	# OF STUDENTS		RELEASE TIME	OVERLOAD CREDITS	OVERLOAD CONTACTS
BOB EASTLEY										
	CONM 100	1	1	1		22				
	CONM 100	1	1	1		19				
	CONM 221	3	3	3		25				
	Acting Director of the School of Built Environment							0.75		
		5	5	5	0	66			2	0
SUZANNE MILLER										
	CONM 112	3	4	2	2	20				
	CONM 116	2	3	1	2	17				
	CONM 116	2	3	1	2	17				
	CONM 116	2	3	1	2	16				
	Program Coordinator of Construction Technology & Management							0.5		
		9	13	5	8	70			3	4
FERRELL CLARK										
	BCTM 213	3	5	2	3	16				
		1	3		3	16				
	CONM 111	3	5	2	3	14				
		1	3		3	8				
	CONM 424	3	3	3		23				
	CONM 424*	3	3	3		16				
		14	22	10	12	93			2	4
MARK DYKE										
	CONM 117	3	4	2	2	15				
	CONM 117	3	4	2	2	15				
	CONM 324	3	4	2	2	17				
	CONM 423	3	3	3		22				
		12	15	9	6	69				
DAVID HANNA										
	BCTM 223	3	4	2	2	11				
	BCTM 223	3	4	2	2	13				
	BCTM 223	3	4	2	2	22				
	CONM 499	3	4	2	2	15				
		12	16	8	8	61				
JEN MILLER										
	CONM 121	3	4	2	3	16				
		1	2		3	16				
	CONM 121	3	4	2	3	15				
	CONM 311	3	3	3		21				
	CONM 311	3	3	3		18				
		13	16	10	9	86			1	

FACULTY MEMBER	COURSE #	CREDITS	CONTACT HOURS	LECTURE HOURS	LAB HOURS	# OF STUDENTS		RELEASE TIME	OVERLOAD CREDITS	OVERLOAD CONTACTS
DAN PRATT										
	CONM 122	3	5	2	3	16				
		1	3		3	16				
	CONM 122	3	5	2	3	15				
		1	3		3	12				
	CONM 412	3	3	3		23				
	BCTM 225	3	5	2	3	13				
	BCTM 225*	3	5	2	3	16				
		17	29	11	18	111			5	11
KELLY SEITTER										
	CONM 121	3	4	2	2	14				
		1	2		2	12				
	CONM 212	3	4	2	2	16				
		1	2		2	16				
	CETM 214	3	4	2	3	16				
		1	3		3	6				
	CETM 215	3	3	3		18				
		15	22	9	14	98			3	4
LEE TEMPLIN										
	CONM 211	3	4	2	2	16				
		1	2		2	12				
	CONM 211	3	4	2	2	16				
		1	2		2	8				
	CONM 222	3	4	2	2	13				
	CONM 312	3	4	2	2	13				
		1	2		2	12				
	CONM 312	3	4	2	2	12				
		18	26	10	16	102			6	8
ADJUNCT										
	CONM 321	3	3	3		23				
		3	3	3		23				

* Designates course taught on Grand Rapids campus

FACULTY TEACHING LOADS 2017 - 2018

SPRING 2018

FACULTY NAME	COURSE #	CREDITS	CONTACT HOURS	LECTURE HOURS	LAB HOURS	# OF STUDENTS		RELEASE TIME	OVERLOAD	
									CREDITS	CONTACTS
BOB EASTLEY										
	CETM 327	3	3	3		18				
	Acting Director of the School of Built Environment							0.75		
		3	3	3	0	18				
SUZANNE MILLER										
	CONM 117	3	4	2	2	16				
	CONM 117	3	4	2	2	16				
	Program Coordinator of Construction Technology & Management							0.5		
		6	8	4	4	32				
BRIAN BEJCEK										
	BCTM 223	3	4	2	2	20				
	CONM 112	3	4	2	2	24				
	CONM 112	3	4	2	2	25				
	CONM 413	3	3	3		27				
		12	15	9	6	96				
FERRELL CLARK										
	BCTM 213	3	5	2	3	16				
	CONM 111	3	5	2	3	14				
		1	3		3	8				
	CONM 111	3	5	2	3	16				
		1	3		3	14				
	CONM 424	3	3	3		26				
		14	24	9	15	94			2	6
MARK DYKE										
	CONM 117	3	4	2	2	16				
	CONM 324	3	4	2	2	9				
	CONM 324	3	4	2	2	17				
	CONM 324	3	4	2	2	12				
	CONM 423*	3	3	3		16				
		15	19	11	8	70			3	1
DAVID HANNA										
	BCTM 223	3	4	2	2					
	BCTM 223	3	4	2	2					
	CONM 430	3	3	3		25				
	CONM 499	3	4	2	2	18				
						17				
	CONM 499*	3	4	2	2	15				
	CENG 321**	3	5	2	3					
		18	24	13	11	75			6	6

FACULTY NAME	COURSE #	CREDITS	CONTACT HOURS	LECTURE HOURS	LAB HOURS	# OF STUDENTS		RELEASE TIME	OVERLOAD CREDITS	OVERLOAD CONTACTS
JEN MILLER										
	CONM 121	3	4	2	3	15				
		1	2		3	16				
	CONM 221	3	3	3		21				
	CONM 221	3	3	3		13				
	CONM 311	3	3	3		22				
	ARCH 223**	3	3	3						
		16	18	14	6	87			4	
DAN PRATT										
	CONM 122	3	5	2	3	14				
		1	3		3	14				
	CONM 412	3	3	3		27				
	BCTM 225	3	5	2	3	14				
		1	3		3	18				
		11	19	7	12	87				1
KELLY SEITTER										
	CONM 116	2	3	1	2	19				
	CONM 212	3	4	2	2	16				
		1	2		2	15				
	CONM 212	3	4	2	2	15				
	CETM 226	3	4	2	2	16				
		1	3		2	4				
		11	17	6	10	66				
LEE TEMPLIN										
	CONM 211	3	4	2	2	16				
		1	2		2	16				
	CONM 222	3	4	2	2	17				
		1	2		2	16				
	CONM 222	3	4	2	2	15				
	CONM 312	3	4	2	2	11				
		1	2		2	7				
		15	22	8	14	98			3	4
ADJUNCT										
	CONM 321	3	3	3		33				
		3	3	3		33				
									18	18

* Designates course taught on Grand Rapids campus
** Designates service course for another program
(note: ARCH 223 and CONM 221 are the same course)

APPENDIX K

Building Construction Technology – 63-64 Credits

Associate of Applied Science (AAS) *College of Engineering Technology*

ADMISSION REQUIREMENTS

New Students

- Students entering the Building Construction Technology program must have a high school diploma with typically a 2.5 GPA or better and be prepared to enroll in all required courses including mathematics and English. Typically students have at least a composite score of ACT 18/SAT950 and an ACT math sub score of 19/SAT math sub score of 500 or better.

Transfer Students

- Must have a minimum 2.0 overall GPA
- Must have at least 12 credits, including an English and a Mathematics course

UNIVERSITY GENERAL EDUCATION REQUIREMENTS			
Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 6 Written Communication Credits Required (or their equivalent)			
ENGL	150	English 1 (ENGL 074 or 14 A01 or 370 S01 or 500 T01 or 173 T02 or 370 S05)	3
ENGL	211	Industrial and Career Writing (C- in ENGL 150)	3
QUANTITATIVE LITERACY COMPENTENCY – 3 Credits Required			
MATH	120	Trigonometry (C- in MATH 115 or 116 OR math ACT 24+/SAT 580+) OR ACT Math 26+/SAT MATH 610+	3
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – 1 course w/lab Required			
PHYS	211	Introductory Physics (C- in MATH 120 or math ACT 26+/SAT 610+)	4
CULTURE COMPETENCY – 1 course with a minimum of 3 Credits Required			
SELF AND SOCIETY COMPETENCY – 1 course with a minimum of 3 Credits Required			

Freshman Seminar Requirement, FSUS 100, is satisfied by:	CONM 100 Orientation to Construction Technology/Management	1

Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – XX Credits Required			
BCTM	213	Wood & Steel Framing and Finishes (CONM 111, 112, 116; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
BCTM	217	Virtual Design and Construction (CONM 116, 117, 211; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+) (CONM 222 co-requisite)	3
BCTM	233	Mechanical Construction Practices (CONM 111, 112, 117; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
BCTM	234	Electrical Construction Practices (CONM 111, 112, 117; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	111	Construction Practices (C- in MATH 110 or higher or math ACT 19+/SAT 500+)	3
CONM	112	Plans & Specifications (CONM 116; C- in MATH 115/116 or higher or math ACT 24+/SAT 580+)	3
CONM	116	Construction Graphics (C- in MATH 110 or higher OR math ACT 19+ or SAT 500+)	2
CONM	117	Construction Building Information Technology (CONM 116; C- in MATH 115/116 or higher or math ACT 24+/SAT 580+) (CONM 112 co-req)	3
CONM	121	Materials Properties & Testing (C- in MATH 115/116 or higher or math ACT 24+/SAT 580+)	3
CONM	122	Construction Surveying & Layout (C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	211	Construction Estimating I (CONM 111 or ARCH 115, CONM 112 or ARCH 102, C- in MATH 120/126 or higher or math ACT 26+/SAT 610)	3
CONM	212	Soils & Foundations (CONM 121 or ARCH 112; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	221	Statics & Structures (PHYS 211; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	222	Construction Administration (CONM 111, 112, 211 or ARCH 101, 102, 115; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	225	Field Engineering (CONM 117, 122; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
ADDITIONAL REQUIREMENTS – XX Credits Required			

Building Construction Technology **Associate of Applied Science - 64 Credits**

ADDITIONAL GRADUATION REQUIREMENTS

Students must

- maintain a 2.00 cumulative GPA in all FSU courses
- have 15 credits of Ferris classes (FSU Residency requirement)
- have a minimum 60 total credits to earn an associate degree
- complete 32 credits of the BCTM and CONM courses at Ferris State University in order to qualify for the Associate's degree.
- 3 of the 4 BCTM courses must be taken at Ferris State University in order to qualify for the Associate's degree.

DEGREE OUTCOMES (the outcomes will be used in TracDAT)	
1.	Meet Industry needs – Provide a curriculum that responds to the changing needs of Industry
2.	Communication – Demonstrate the ability to communicate effectively using written and graphical methods throughout the construction process
3.	Team building – Function as a member of the construction project management team
4.	Methods – Demonstrate an understanding of the design, layout, materials, means and methods of the built environment
5.	Process –Analyze construction documents for project planning and management of construction processes
6.	Ethics – Apply professional and ethical standards of behavior in dealing with all stakeholders in the construction process
7.	Structures – Understand the basic principles of structural behavior
8.	Technology – Apply technology to manage the construction process

Semester-by-Semester layout of classes

FIRST YEAR

Fall Semester

Class	Credits
CONM 100	1
CONM 116	3
CONM 121	3
ENGL 150	3
MATH 120	3
Culture	3-4
Total Credits	15-16

Spring Semester

Class	Credits
CONM 111	3
CONM 112	3
CONM 117	3
ENGL 211	3
PHYS 211	4
Total Credits	16

Summer Semester

Class	Credits
Total Credits	

SECOND YEAR

Fall Semester

Class	Credits
BCTM 213	3
BCTM 235	3
CONM 122	3
CONM 211	3
CONM 221	3
Total Credits	15

Spring Semester

Class	Credits
BCTM 217	3
BCTM 234	3
CONM 212	3
CONM 222	3
CONM 225	3
Self and Society	3
Total Credits	18

Summer Semester

Class	Credits
Total Credits	

Civil Engineering Technology – Highway Emphasis – 63-64 Credits

Associate of Applied Science (AAS) *College of Engineering Technology*

FERRIS STATE UNIVERSITY

ADMISSION REQUIREMENTS

New Students

- Students entering the Building Construction Technology program must have a high school diploma with typically a 2.5 GPA or better and be prepared to enroll in all required courses including mathematics and English. Typically students have at least a composite score of ACT 18/SAT950 and an ACT math sub score of 19/SAT math sub score of 500 or better.

Transfer Students

- Must have a minimum 2.0 overall GPA
- Must have at least 12 credits, including an English and a Mathematics course

UNIVERSITY GENERAL EDUCATION REQUIREMENTS			
Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 6 Written Communication Credits Required (or their equivalent)			
ENGL	150	English 1 (ENGL 074 or 14 A01 or 370 S01 or 500 T01 or 173 T02 or 370 S05)	3
ENGL	211	Industrial and Career Writing (C- in ENGL 150)	3
QUANTITATIVE LITERACY COMPENTENCY – 3 Credits Required			
MATH	120	Trigonometry (C- in MATH 115 or 116 OR math ACT 24+/SAT 580+) OR ACT Math 26+/SAT MATH 610+	3
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – 1 course w/lab Required			
PHYS	211	Introductory Physics (C- in MATH 120 or math ACT 26+/SAT 610+)	4
CULTURE COMPETENCY – 1 course with a minimum of 3 Credits Required			
SELF AND SOCIETY COMPETENCY – 1 course with a minimum of 3 Credits Required			

Freshman Seminar Requirement, FSUS 100, is satisfied by:	CONM 100 Orientation to Construction Technology/Management	1

Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – XX Credits Required			
CETM	214	Adv. Materials Properties & Testing (CONM 121; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CETM	215	Construction Equipment & Operations (CONM 121; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CETM	226	Highway Technology (CONM 112, 117, 122; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CETM	227	Hydraulics & Hydrology (PHYS 211; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	111	Construction Practices (C- in MATH 110 or higher or math ACT 19+/SAT 500+)	3
CONM	112	Plans & Specifications (CONM 116; C- in MATH 115/116 or higher or math ACT 24+/SAT 580+)	3
CONM	116	Construction Graphics (C- in MATH 110 or higher OR math ACT 19+ or SAT 500+)	2
CONM	117	Construction Building Information Technology (CONM 116; C- in MATH 115/116 or higher or math ACT 24+/SAT 580+) (CONM 112 co-req)	3
CONM	121	Materials Properties & Testing (C- in MATH 115/116 or higher or math ACT 24+/SAT 580+)	3
CONM	122	Construction Surveying & Layout (C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	211	Construction Estimating I (CONM 111 or ARCH 115, CONM 112 or ARCH 102, C- in MATH 120/126 or higher or math ACT 26+/SAT 610)	3
CONM	212	Soils & Foundations (CONM 121 or ARCH 112; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	221	Statics & Structures (PHYS 211; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	222	Construction Administration (CONM 111, 112, 211 or ARCH 101, 102, 115; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	225	Field Engineering (CONM 117, 122; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
ADDITIONAL REQUIREMENTS – XX Credits Required			

ADDITIONAL GRADUATION REQUIREMENTS

***Civil Engineering Technology – Highway Emphasis*- Associate of Applied Science – 63-64 Credits**

Students must
- maintain a 2.00 cumulative GPA in all FSU courses
- have 15 credits of Ferris classes (FSU Residency requirement)
- have a minimum 60 total credits to earn an associate degree
- complete 32 credits of the CETM and CONM courses at Ferris State University in order to qualify for the Associate's degree.
- 3 of the 4 CETM courses must be taken at Ferris State University in order to qualify for the Associate's degree.

DEGREE OUTCOMES (the outcomes will be used in TracDAT)	
1.	Meet Industry needs – Provide a curriculum that responds to the changing needs of Industry
2.	Communication – Demonstrate the ability to communicate effectively using written and graphical methods throughout the construction process
3.	Team building – Function as a member of the construction project management team
4.	Methods – Demonstrate an understanding of the design, layout, materials, means and methods of the built environment
5.	Process –Analyze construction documents for project planning and management of construction processes
6.	Ethics – Apply professional and ethical standards of behavior in dealing with all stakeholders in the construction process
7.	Structures – Understand the basic principles of structural behavior
8.	Technology – Apply technology to manage the construction process

Semester-by-Semester layout of classes

FIRST YEAR

Fall Semester

Class	Credits
CONM 100	1
CONM 116	3
CONM 121	3
ENGL 150	3
MATH 120	3
Culture	3-4
Total Credits	15-16

Spring Semester

Class	Credits
CONM 111	3
CONM 112	3
CONM 117	3
ENGL 211	3
PHYS 211	4
Total Credits	16

Summer Semester

Class	Credits
Total Credits	

SECOND YEAR

Fall Semester

Class	Credits
CETM 214	3
CETM 215	3
CONM 122	3
CONM 211	3
CONM 221	3
Total Credits	15

Spring Semester

Class	Credits
CETM 226	3
CETM 227	3
CONM 212	3
CONM 222	3
CONM 225	3
Self and Society	3
Total Credits	18

Summer Semester

Class	Credits
Total Credits	

FERRIS STATE UNIVERSITY

Construction Management – 122-123 Credits

Bachelor of *Science* — ***College of Engineering Technology***

ADMISSION REQUIREMENTS

Internal/Continuing Transfer Students

- 2.5 Cumulative GPA
- Passed MATH 120/126 with a C or better (or transfer equivalent with C or better for transfer) or higher Math
- Credit for PHYS 211
- Completion of the AAS-BCTM or AAS-CETM degree or equivalent courses prior to entry into the 300 and 400 level CONM courses
- 2.0 GPA in Associate degree major courses

Transfer Students

UNIVERSITY GENERAL EDUCATION REQUIREMENTS			
Required		Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 12 Credits Required (or their equivalent)			
COMM	121	Fundamentals of Public Speaking	3
ENGL	150	**English 1** (SAT 370 OR ACT 14 OR ENGL 074 with C- or better)	3
ENGL	250	**English 2** (C- in ENGL 150)	3
ENGL	311	Advanced Technical Writing (C in ENGL 211 or 250)	3
QUANTITATIVE LITERACY COMPETENCY – 3 Credits Required			
MATH	132	Calculus for Business (C-in MATH 120/126 or math ACT 26+/SAT 610+)	3
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – minimum 6 Credits Required; at least one must be a class with a lab			
		Scientific Understanding Lab Elective (CHEM 114, 121, PHYS 212, GEOL 121, PHSC 110, or GEOG 111)	3-4
PHYS	211	Introductory Physics (C- in MATH 116 or 120 or math ACT 26+/SAT 610+)	4
CULTURE COMPETENCY – 9 Credits Required * ***; Courses in this category must come from two different disciplines			
		(200+)	
SELF AND SOCIETY COMPETENCY – 9 Credits Required * ***; Courses in this category must come from two different disciplines			
		Foundation	
		(200+)	
TIER 3: APPLICATION COMPETENCIES			
COLLABORATION – 2 courses Required **			
		Courses met in major. Look in Major/Core section for course prefix marked with ⊙	
PROBLEM SOLVING – 2 courses Required **			
		Courses met in major. Look in Major/Core section for course prefix marked with ⊙	

Freshman Seminar Requirement, FSUS 100, is satisfied by:	CONM 100

* General Education Requirements - |"Diversity (both Global and U.S. Diversity)"and "Self and Society Foundation" requirements must be met either through Culture or Self and Society or other courses | must have a 200 level course in both Culture and Self and Society Courses. | The Self and Society Foundation course can be your 200+ course.

** Some courses include both Collaboration and Problem Solving attributes

*** 2 credits of either Self and Society or Culture Competency must be at the 300 level or higher

Construction Management - Bachelor of Science - 122 Credits

Prefix	###	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – 29 Credits Required (these courses ARE used in the core GPA requirement)			
CONM	311	Formwork and Temporary Structures (CONM 212, 221, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+; PHYS 211)	3
CONM	312	Construction Scheduling (CONM 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	321	Construction Estimating II (CONM 211, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	324	Advanced Construction Computer Techniques and Technology (CONM 117, 211, 222, 225)	3
CONM	373	Ethics and Professionalism in Construction (CONM 211, 222, 225) (co-req ENGL 311)	1
CONM	412	Construction Contracts (CONM 222, 225, 312, 321; BLAW 301, ENGL 311)	3
CONM	413	Construction Economics (CONM 222, 225, 321; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	424	Construction Safety and Management (CONM 222, 225, 311; ENGL 311)	3
CONM	499	Construction Project Management (CONM 311, 312, 321, 324, 373, 413, 424; ENGL 311)	3
		Advisor-directed Electives (4 credits). Choose from the following list:	
CONM	460	Current Topics in Construction Management (repeatable up to two times – different topic) (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	461	Sustainability in Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	462	Power and Process Plant Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	463	Infrastructure Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
TECHNICAL RELATED – 9 Credits Required (these courses ARE NOT used to calculate the major GPA requirement)			
ACCT	221	Principles of Construction Accounting (C- in MATH 115 OR math ACT 24+/SAT 580+)	3
BLAW	301	Legal Environment of Business	3
MGMT	3--	Management Elective (MGMT 302, 305, 373, 310 (with permission))	3
ADDITIONAL REQUIREMENTS – 44 Credits Required			
		100 & 200 LEVEL CONM, BCTM, CETM (1@, 2@)	33

ADDITIONAL GRADUATION REQUIREMENTS

Students must
- maintain a 2.00 cumulative GPA in all FSU courses
- have 40 credits at the 300/400 level
- have 30 credits of Ferris classes (FSU Residency requirement)
- have a minimum 120 total credits to earn a bachelor degree
- 22 of the 20 credits earned with the 300 and 400 level CONM courses must be taken at Ferris State University

DEGREE OUTCOMES (the outcomes will be used in TracDAT)	
1.	Meet our accrediting body's (American Council for Construction Education – ACCE) 20 Student Learning Outcomes (SLOs)

Construction Management - Bachelor of Science - 122 Credits

Semester-by-Semester layout of classes

FIRST YEAR & SECOND YEAR
COMPLETED WITH AAS – CETM OR BCTM LAYOUTS

THIRD YEAR

Fall Semester

Class	Credits
CONM 311	3
CONM 312	3
CONM 373	1
ACCT 221	3
ENGL 311	3
MATH 132	3
Total Credits	16

Spring Semester

Class	Credits
CONM 321	3
CONM 324	3
COMM 121	3
Natural Science	3-4
Econ 221	3
Total Credits	15-16

Summer Semester

Class	Credits
Total Credits	

FOURTH YEAR

Fall Semester

Class	Credits
CONM 413	3
CONM 424	3
CONM 46-	2
BLAW 301	3
MGMT 3--	3
Culture	3
Total Credits	17

Spring Semester

Class	Credits
CONM 412	3
CONM 46-	2
CONM 499	3
Culture	3
Self and Society	3
Total Credits	14

Summer Semester

Class	Credits
Total Credits	

FERRIS STATE UNIVERSITY

Construction Management – 128-134 Credits

For FSU AAS Architectural Technology Graduates

Bachelor of Science **College of Engineering Technology**

ADMISSION REQUIREMENTS
Internal/Continuing Transfer Students
2.5 Cumulative GPA
Passed MATH 120/126 with a C- or better (or transfer equivalent with C or better for transfer)
Credit for PHYS 211
Completion of the AAS – BCTM or AAS-CETM degree or equivalent courses prior to entry into the 300 and 400 level CONM courses
(2.0 GPA in Associate Degree major courses)

UNIVERSITY GENERAL EDUCATION REQUIREMENTS			
Required		Course Title (Prerequisites shown in parenthesis)	Crs
TIER 1: FOUNDATION COMPETENCIES			
COMMUNICATION COMPETENCY – 12 Credits Required (or their equivalent)			
COMM	121	Fundamentals of Public Speaking	3
ENGL	150	English 1 (SAT 370 OR ACT 14 OR ENGL 074 with C- or better)	3
ENGL	211 or 250	Industrial and Career Writing (C- or better in ENGL 150) OR English 2 (C- in ENGL 150)	3
ENGL	311	Advanced Technical Writing (C or better in ENGL 250 or 211)	3
QUANTITATIVE LITERACY COMPETENCY – 3 Credits Required			
MATH	132	Calculus for Business (C- in MATH 120/126 OR math ACT 26+/SAT 610+)	3
TIER 2: DISTRIBUTION COMPETENCIES			
NATURAL SCIENCES COMPETENCY – minimum 6 Credits Required; at least one must be a class with a lab			
		Scientific Understanding Elective (Recommend CHEM 114, 121, PHYS 212, GEOL 121, PHSC 110, GEOG 111)	3-4
PHYS	211	Introductory Physics (C- in MATH 116 or 120 or math ACT 26+/SAT 610+)	4
CULTURE COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
ARTS	101	Basic Art	3
ARCH	244	Architectural History (ENGL 150)	3
ARCH	245	Architectural History 2 (ARCH 244)	3
SELF AND SOCIETY COMPETENCY – 9 Credits Required *; Courses in this category must come from two different disciplines			
SOCY	121	Introductory Sociology	3
ECON	221	Principles of Economics 1 Foundation & 200+	3
TIER 3: FOUNDATION COMPETENCIES			
COLLABORATION COMPETENCY – 2 courses Required **			
		Should be met by courses identified in the major. Here, list the courses from the major identified for Collaboration	
CONM	225	Field Engineering	
CONM	499	Construction Project Management	
PROBLEM SOLVING COMPETENCY – 2 courses Required **			
		Should be met by courses identified in the major. Here, list the courses from the major identified for Problem Solving	
CONM	424	Construction Safety & Management	
CONM	499	Construction Project Management	

First year Seminar Requirement, FSUS 100, is satisfied by:	COMN 100 or FSUS 100

* General Education Requirements - ❙"Diversity (both Global and U.S. Diversity)"and "Self and Society Foundation" requirements must be met either through Culture or Self and Society or other courses ❙ must have a 200 level course in both Culture and Self and Society Courses. ❙ The Self and Society Foundation course can be your 200+ course.

** Some courses include both Collaboration and Problem Solving attributes

Construction Management - Bachelor of Science- 128-134 Credits
For FSU AAS Architectural Technology Graduates

Prefix	CONM	Course Title (Prerequisites shown in parenthesis)	Crs
MAJOR REQUIREMENTS – 44 Credits Required (these courses ARE used to calculate the major GPA requirement)			
CONM	122	Construction Surveying & Layout (C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3
CONM	211	Construction Estimating I (CONM 111 or ARCH 115, CONM 112 or ARCH 203, C- in MATH 120/126 or higher or math ACT 26+/SAT 610) *	3
CONM	212	Soils and Foundations (CONM 121 or ARCH 112, C- in MATH 120/126 OR math ACT 26+/SAT 610+) *	3
CONM	222	Construction Administration (CONM 211, C- in MATH 120/126 OR math ACT 26+/SAT 610+) *	3
CONM	225	Field Engineering (CONM 117 or ARCH 204, 122; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	
CONM	311	Formwork and Temporary Structures (CONM 212, 221, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+; PHYS 211)	3
CONM	312	Construction Scheduling (CONM 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	321	Construction Estimating II (CONM 211, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	324	Advanced Construction Computer Techniques and Technology (CONM 117 or ARCH 204: CONM 122, 211, 222, 225)	3
CONM	373	Ethics and Professionalism in Construction (CONM 211, 222, 225) (co-req ENGL 311)	1
CONM	412	Construction Contracts (CONM 222, 225, 312, 321; BLAW 301, ENGL 311)	3
CONM	413	Construction Economics (CONM 222, 225, 321; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3
CONM	424	Construction Safety and Management (CONM 222, 225, 311; ENGL 311)	3
CONM	499	Construction Project Management (CONM 311, 312, 321, 324, 373, 413, 424; ENGL 311)	3
		Advisor-directed Electives (4 credits). Choose from the following list:	
CONM	460	Current Topics in Construction Management (repeatable up to two times – different topic) (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	461	Sustainability in Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	462	Power and Process Plant Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
CONM	463	Infrastructure Construction (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2
TECHNICAL RELATED – 9 Credits Required (these courses ARE NOT used to calculate the major GPA requirement)			
ACCT	221	Principles of Construction Accounting (C- in MATH 115 OR math ACT 24+/SAT 580+)	3
BLAW	301	Legal Environment of Business	3
MGMT	3--	Management Elective (MGMT 302, 305, 373, 310 (with permission))	3
Associate Degree Course work – 41 Credits Required to meet the 127 credits of BS degree			
		100, 200, 300 Level ARCH and HVAC (1@, 2@, 3@)	44

- Denotes courses that may be taken as electives in the AAS-ARCH degree – up to 2 courses can be applied toward the AAS-ARCH degree

ADDITIONAL GRADUATION REQUIREMENTS

Students must
- maintain a 2.00 cumulative GPA
- have a minimum of 40 credits at the 300/400 level
- have a minimum of 30 credits of Ferris classes (FSU Residency requirement)
- have a minimum of 120 total credits to earn a bachelor degree
- 22 of the 29 credits earned with the 300 and 400 level CONM courses must be taken at Ferris State University

DEGREE OUTCOMES (the outcomes will be used in TracDAT)	
1.	Meet our accrediting body's (American Council for Construction Education – ACCE) 20 Student Learning Outcomes (SLOs).

Construction Management - Bachelor of Science- 128-134 Credits

For FSU AAS Architectural Technology Graduates

Semester-by-Semester layout of classes

YEAR 3 - FALL SEMESTER/AAS AT - ARCHITECTURAL ELECTIVES			Crs	Gr
CONM	122	Construction Surveying & Layout (C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3	
CONM	211	Construction Estimating I (CONM 111 or ARCH 115, CONM 112 or ARCH 203, C- in MATH 120/126 or higher or math ACT 26+/SAT 610)	3	
CONM	212	Soils and Foundations (CONM 121 or ARCH 112, C- in MATH 120/126 OR math ACT 26+/SAT 610+)	3	
CONM	222	Construction Administration (CONM 211, C- in MATH 120/126 OR math ACT 26+/SAT 610+)	3	
CONM	225	Field Engineering (CONM 117 or ARCH 204, CONM 122; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3	
		Total	**15**	

YEAR 3 - SPRING SEMESTER			Crs	Gr
CONM	311	Formwork and Temporary Structures (CONM 212, CONM 221 or ARCH 223, CONM 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+; PHYS 211)	3	
CONM	312	Construction Scheduling (CONM 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3	
CONM	373	Ethics and Professionalism in Construction (CONM 211, 222, 225) (co-req ENGL 311)	1	
ACCT	221	Principles of Construction Accounting (C- in MATH 115 or higher OR math ACT 24+/SAT 580+)	3	
ENGL	311	Advanced Technical Writing (C in ENGL 211 or 250)	3	
MATH	132	Calculus for Business (C- in MATH 120/126 OR math ACT 26+/SAT 610+)	3	
		Total	**16**	

YEAR 4 - FALL SEMESTER				
CONM	321	Construction Estimating II (CONM 211, 222, 225; C- in MATH 120/126 or higher OR math ACT 26+/SAT 610+)	3	
CONM	324	Advanced Construction Computer Techniques and Technology (COMN 117 or ARCH 204; CONM 122, 211, 222, 225)	3	
COMM	121	Fundamentals of Public Speaking	3	
_____	_____	Scientific Understanding Elective (Recommend CHEM 114, 121, PHYS 212, GEOL 121, PHSC 110, GEOG 111)	3-4	
ECON	221	Principles of Economics 1 (MATH 115 or higher or math ACT 24+/SAT 580+)	3	
		Total	**15-16**	

YEAR 4 - SPRING SEMESTER			Crs	Gr
CONM	413	Construction Economics (CONM 222, 225, 321; C- in MATH 120/126 or higher or math ACT 26+/SAT 610+)	3	
CONM	424	Construction Safety and Management (CONM 222, 225, 311; ENGL 311)	3	
CONM	4--	Construction Elective I - CONM 460, 461, 462, or 463 (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	3	
BLAW	301	Legal Environment of Business	3	
MGMT	3--	Management Elective – MGMT 302, 305, or 373 or 310 (with permission)	3	
_______	_____	Cultural Enrichment Elective (200 level or above)	3	
		Total	**18**	

YEAR 5 - FALL SEMESTER			Crs	Gr
CONM	412	Construction Contracts (CONM 222, 225; BLAW 301; ENGL 311)	3	
CONM	4--	Construction Elective II - CONM 460, 461, 462, or 463 (CONM 225, 311, 312, 321, 324, 373; ENGL 311)	2	
CONM	499	Construction Project Management (CONM 311, 312, 321, 324, 373, 413, 424; ENGL 311)	3	
______	_____	Cultural Enrichment Elective	3	
______	_____	Social Awareness Elective	3	
		Total	**14**	

APPENDIX L

Ferris State University
College of Engineering Technology

Candidate Observation Guide

To be submitted by each member of the Candidate's Tenure Review Committee and at least one member of the Department/Program Tenure Review Committee during the fall and spring semesters. The Department Chair shall also submit a Candidate's Observation Guide each fall semester.

Candidate: ______________________ Observer: ______________________

Course: ______________________ Date: ______________________

Insert ratings below as follows:				
	1.	Exceeds expectations	U	Unknown
	2.	Meets expectations	NA	Not applicable
	3.	Does not meet expectations		

	Rating	Comments
Presentation:		
Preparation		
Material Logically Sequenced		
Mental Control Demonstrated		
Initial Objectives Stated		
Major Points Emphasized		
Feedback Generated		
Response to Questions		
Presentation Individualized to Class		
Media Used Appropriately		
Examples Appropriately Given		
Content Aligns With Course Outline		
Speaking Skills (i.e. grammar, pronunciation, voice, eye contact, etc.)		
Content Consistent with Initial Objectives		
Reviews Major Points		
Application:		
Assignment/Activity Appropriate		
Assignment/Activity Time Allocation		
Evaluation Process Explained		
Homework/Reading Followed Lecture Content		
General:		
Communication Skills		
Enthusiasm Exhibited		
High Expectations Communicated		
Control of Class Maintained		
Cooperation Encouraged		
Concern for the Student Shown		
Diverse Learning Styles Valued		

Ferris State University
College of Engineering Technology
Candidate Observation Guide

Syllabus		
Lab Skills:		
Student Interaction		
Activity is Effective for Learning		
Time is Well Managed		
Evaluation Based on Experience		
Students Well Managed		
General University Obligations:		
Meets Office Hours		
Role as an Advisor		
Active participant in Department Initiatives and Activities		
Active on Department Committees		
Active on College Committees		
Active on University Committees		

Use additional space or sheets as desired -

Comments:
Strengths:
Weaknesses:
Recommendations:

Observer's Signature: ____________________ Date: __________

Please return completed form to the Associate Dean's office – Johnson Hall 200

APPENDIX M

Ferris State University

Construction Technology and Management Industry Advisory Board Agenda

October 26, 2017

10:15 – 11:00 am	Meet and Greet with Industry Advisory Board Members, Faculty, Student Organization Representatives– coffee provided
11:00 – 12:00 pm	IAB Session with Students
12:00 – 12:45 pm	**Lunch**
12:45 – 2:30 pm	Introductions of IAB members Review of student feedback session Review and approve previous meeting minutes Update on what is happening within the program Review of dashboard information Industry support of new mechanical and electrical practices courses Review of IAB Meeting Preparation Content not called out specifically below
2:30 - 2:45 pm	**Break**
2:45 – 3:15 pm	Campaign for the Construction Technology & Management Program
3:15 – 3:45pm	New graduate survey review
3:45 – 4:00 pm	Dean Larry Schult Q&A
4:00 – 4:15 pm	Recent Graduate IAB Member Report to the IAB (Mark Krueger and Max Schmidt)
4:15 – 4:20 pm	ICET Update
4:20 – 4:45pm	Standing Committee Updates
4:45pm	**Adjourn**

IAB Meeting Preparation

October 26, 2017

GRN 105, Granger Building, Big Rapids, MI

PRE-MEETING PREPARATION STRATEGY

In order to enable more time for dialogue between IAB members and our faculty representatives, we are providing the following summary of important information relative to planned discussion plus documents that should be reviewed prior to the meeting to facilitate an efficient and effective IAB discussion. Please review the attached documents and agenda. We are looking forward to a very effective and enjoyable meeting.

PREVIOUS MEETING MINUTES

The Spring 2017 IAB Meeting Minutes are included separately in this email for you to review prior to approving them at this Fall 2017 meeting.

ACCE ACCREDITATION

We received formal approval for the delay of our accreditation visit. The new visit will occur in Fall 2018. The report will be due June 1, 2018. We will be sending out alumni, employer, and IAB member surveys in the spring for the report. The Accreditation/Curriculum Subcommittee will be involved with this process, as will the IAB overall.

DASHBOARD

You will notice from the dashboard that our enrollment numbers continued to be strong. For Fall 2017 our entry class was the same size as last year. Transfers continue to account for over 30% of our student body.

Overall, enrollment has decreased at the University. Accordingly the entire University was faced with budget cuts, so our budget will not increase, despite our increase in program enrollment.

STAFFING

Current - We hired a new faculty member, Jen Miller, two weeks before classes began. Jen came to us from the City of Saginaw's Engineering Department. She received her BS in Civil Engineering from Michigan Tech and is a Registered Engineer. She has spent time with both contractors and design agencies, focused on both commercial and heavy civil construction. She is teaching one of the lectures/labs of CONM 121 Materials Properties & Testing, CONM 221 Statics & Structures, and CONM 311 Formwork and Temporary Structures.

As indicated earlier in the semester, John Schmidt retired two weeks before classes began. We were able to cover his classes with Dan Pratt and Suzanne Miller accepting overloads as well as having a Manufacturing Professor offer another section of his MFGE 423 Engineering Economics course (to replace our CONM 413 Construction Economics) for the semester.

We have a viable schedule for the Spring 2018 semester. However, many faculty are still on overload; a new faculty member is incorporated into the mix; and 2-3 anticipated adjuncts teaching Cost Estimating in Big Rapids as well as our Professional Methods (Sustainability) course in Grand Rapids are included. We have found an acceptable candidate for the Cost Estimating course in Big Rapids and are currently working through the hiring process.

Future - We hired a new faculty member in the middle of September. He comes to us from the power industry with a BS in Mechanical Engineering and an MS in Electrical Engineering. In the spring, he is scheduled to teach BCTM 223 Mechanical/Electrical Plans and Specifications, CONM 413 Engineering Economics, and CONM 112 Plans and Specifications. In the future, he will be responsible for developing and teaching our new BCTM 235 Mechanical Construction Practices course and BCTM 234 Electrical Construction Practices course.

Despite the University budget cuts, we received approval to replace John Schmidt. The advertisement will be going out within the week with interviews scheduled to begin in January. The job posting will remain open until filled. We are looking for an all-around individual with computer software knowledge (particularly 3-D modeling). We anticipate a Fall 2018 start for this individual.

CONM CERTIFICATES

We currently have only 1 certificate – Construction Administration. This covers CONM 211 Estimating I, CONM 222 Construction Administration, CONM 312 Scheduling, and CONM 321 Construction Estimating II. It required Trigonometry, CONM 111 Construction Practices, and CONM 112 Plans and Specifications as prereqs to the courses. (CONM 116 is a prerequisite to CONM 112). Realistically, it can take a student 5 semesters to complete the certificate if they do not have a construction background.

We closed the other certificate – Advanced Construction Management because we eliminated CONM 423 Professional Methods (Sustainability) from the program in its current form as it required an additional prerequisite (CONM 117). The certificate used to require CONM 324 Advanced Computer Techniques, CONM 412 Contracts, CONM 424 Safety & Management, and CONM 423 Professional Methods.

Only 6 credits are traditionally required for a certificate. The faculty have determined that we would like to resurrect the Advanced Construction Management certificate with just CONM 324, 412, and 424.

We also propose renaming the certificates "Certificate – Construction Operations" and "Certificate – Advanced Construction Operations".

STUDENT INVOLVEMENT

At our Spring 2017 meeting, we decided that at our next meeting we would hold a roundtable session with students and IAB members similar to what HVACR does with their IAB. Students would submit questions before the meeting and then they would rotate to different IAB member tables. This suggestion will begin in Spring 2018 which will make for a tight schedule with the student awards and scholarships luncheon, however, it does give the IAB a second opportunity to speak with students during the school year.

PROPOSED STUDENT EXIT SURVEY

We are suggesting a new student exit survey that will help us with our accreditation report and to help ensure we are getting adequate feedback from students – it is in a rough form but it should be implemented this semester to help with our accreditation. It is based on a survey from Ohio State University that John Schmidt reviewed on one of his accreditation visits and indicated it was a good survey for accreditation.

Please take the time to review the attached survey for the meeting. We will discuss your comments during the meeting. If extensive, we would appreciate your mark ups to facilitate modifying the survey.

MATH 132 – CALCULUS FOR BUSINESS

The faculty met with the primary math instructor for MATH 132 Calculus for Business. She explained how she has been slowly changing the course. It is the Math Department's intention to revise this course's content and name since it is only taken by construction management and elementary education students – one title we discussed was "Geometric Calculus" as we requested an emphasis on geometry. Due to our increased enrollment, and to give her more time to develop the course, the Math Department added another section of the course. The instructor requested sample homework problems from our faculty to understand what we demand of our students and help her develop the course. Any ideas you may have would be appreciated.

STUDENT FEEDBACK REQUEST

Students requested more opportunity to learn communication skills (Mock phone calls, mock meetings, how to deal with these types of situations) – submittal of ideas from the IAB to consider was assigned to the Mentorship Subcommittee at the Spring 2017 meeting. A verbal report or written comments would be appreciated.

NEW RECENT-GRADUATE MEMBER OF THE IAB

The faculty unanimously voted Max Schmidt to be our new recent-graduate member of the IAB as Mark Krueger transitions to his 2nd year. Max is employed by Elzinga & Volkers.

Faculty also received a request from a student to be considered as the recent graduate representative on the IAB (starting Fall 2018). We discussed it and agreed that Brendan Pudduck will be an excellent recent graduate representative on the IAB.

TRANSFER STUDENT GUIDES

Suzanne has been working on transfer course guidelines for some of Michigan's community colleges. Transfer students tend to require a large number of credits to graduate with our degree when they pursue the AAS elsewhere. Selected transfer guides are being provided to the Accreditation/Curriculum Subcommittee for their review.

MEMBERSHIP

The membership rotation should be reviewed to determine whose membership term is up for renewal.

Elizabeth Bovard was voted in as a member of the IAB at the Spring 2017 meeting.

We have discussed Chad Comps from AMI and Andrew Hart from Aldridge Electric as possible candidates. If you have any others, please bring their names and contact information with you to the meeting.

SUBCOMMITTEE MEMBERSHIP

Membership on our subcommittees should be reviewed as we have had some faculty and membership changes.

- Accreditation/Curriculum needs a faculty member on it
- Ken Lawless has agreed to step in as the Chair of the Development committee. His status has been revised to Owner's Representative.
- Rob Lewis and Elizabeth Bovard are not member of a subcommittee
- Do any IAB members wish to change committees?

CAMPAIGN FOR THE CONSTRUCTION TECHNOLOGY & MANAGEMENT PROGRAM

At our last meeting we ran through the numbers and indicated that the Program consistently overspends its budget by $30,000, despite best efforts at controlling costs. The most significant costs contributing to the overrun are in the Supply & Expenses (S&E) budget and include approximately $16,000 for materials used in the labs, $13,000 for student travel, and $12,000 for course-related copies. Faculty travel to industry organization meetings and professional development designed to keep us up-to-date with our teaching and topics has been limited due to the lack of available funds. This will impact us negatively on our Accreditation visit.

We agreed at the spring meeting that we should pursue the creation of an endowment provide needed funds for S&E and professional development. An endowment with a value of $750,000 would give us a 4% return annually of $30,000. This would essentially cover our program's overrun as it stands currently.

We believe it would be prudent to pursue the companies that typically hire our students to aid us with creating the larger portion of the endowment. It would take 38 companies donating $20,000 each to reach $750,000.

3 tiers of contractors/suppliers have been created as target donors. The 1st and 3rd tier are focused to help with educational expenses that would otherwise have to be passed on to the students. The 2nd tier is targeted to bolster the existing student competition endowment.

While each tier has a requested amount, we would likely enable the "return" card to also show lower amounts, a blank for them to write in an amount, and also the option to pledge 50% this year and 50% next year.

We would like the IAB's view on the endowment campaign, the targeted companies, the targeted amount, and the approach we should consider to maximize our success.

COURSE REVIEW

We would like to start reviewing course content in depth with the IAB at each meeting – looking at 2-3 classes at each meeting. At the Spring 2018 meeting our new faculty member should be able to expand upon how he intends to proceed with the new mechanical and electrical courses (BCTM 234 and BCTM 235). We will be looking for some feedback from the IAB at that time.

The faculty would like to present CONM 116 Construction Graphics and our new course CONM 373 Professionalism and Ethics in Construction at the Spring meeting as we look to implement and change those courses.

Kelly Seitter would like some input regarding the drafting/modeling software being used by the heavy civil industry. AutoCAD has changed a lot from its earlier days and if there is a different software that industry is using, she would be happy to switch to that program instead.

Is the IAB pleased with this course review array and are there any other courses the IAB would like to suggest for future IAB discussion?

MECHANICAL/ELECTRICAL PRACTICES COURSES

We will be needing industry support for the development of our 2 new mech/elec practices courses – specifically with the lab portion. We are intending to use the HVAC Fabrication Lab for the first year as our new instructor develops the 2 courses. Ultimately, we may move the Soils Lab into the Materials Lab to open up the space for the mechanical and electrical labs. It would improve the use of both labs.

We could use some industry contacts to pursue for help with possible used equipment, tools, materials, etc. How can we most efficiently provide information to you to determine if such equipment is available?

Ideas on what should be targeted in the classes will also be appreciated. The two outlines are included with the packet for your review.

Ferris State University Construction Technology and Management Programs	**2017-2018 Fall Only**	**2016-2017**	**2015-2016**	**2014-2015**	**2013-2014**	**2012-2013**	**2011-2012**	**2010-2011**
Freshman Class Size (Fall semester) CONM 100	42	38	38	35	32	19	21	25
Freshman Class Size (Both Semesters) CONM 116	70	73	65	46	59	49	59	40
Total Students	274	260	249	220	223	220	253	289
BCTM	152	126	75	18	15	13		
CETM	28	24	20	14	9	9		
CONM	94	108	143					
"Pre-" CONM or BCTM or CETM**	0	12	11	9	6	12		
Enrollment % Change From Prior Year	105%	104%	113%	99%	101%	87%	88%	87%
Number of Female students	15	14	14	11				
Number of Minority students	22	24	29	29	33			
Number of Veteran students		10	7	7				
Number of Degrees Conferred								
CONM		48	54	38	42	71	63	69
BCTM (Associates)		42	11	33	25	40	38	37
CETM (Associates)		12	6	12	13	12	20	20
Certificates		0	0	2	0	3	0	3
Number of Faculty (Full-time)	7.75	7.25	7.75	8	10	11	11	11
Number of BCTM courses (not sections) taught Fall and Spring	4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
Number of CETM courses (not sections) taught Fall and Spring	2	2 2	2 2	2 2	2 2	2 2	3 2	3 2
Number of CONM courses (not sections) taught Fall and Spring	23 23	24 23	24 23	24 23	24 23	24 23	23 22	23 22
# of courses per faculty member - Fall and Spring			3.9	3.75	3	2.72	2.72	2.72
Program Budget	$44,400.00	$44,400.00	$49,406.00	$49,406.00	$49,406.00	$57,128.00	$67,332.00	$75,130.00
Program Reimbursement (Professional Development, ABC, GR Incentive)		$14,872.20						
Program Expenses		$74,211.11	$75,420.00	$77,262.27	$64,983.35	$83,426.00	$93,228.00	$95,114.00
Budget Per Student	$162.04	$170.77	$198.42	$224.57	$221.55	$259.67	$266.13	$259.97
Expenses Per Student		$285.43	$302.89	$351.19	$291.41	$379.21	$368.49	$329.11
Budget % Change from Prior Year	0.0%	-10.1%	0.0%	0.0%	-13.5%	-15.2%	-10.4%	
Student to Faculty Ratio	35.4:1	35.9:1	32.6:1	27.5:1	23:1	23:1	23:1	26:1
Placement % at graduation (within 4 months)***		95% (100%)	96% (100%)	92% (100%)	95% (100%)	91% (100%)		65%
Average Graduate Salary		$56,500.00	$55,000	$50,579	$48,237	$48,166		$37,928
New Courses Added	0	0	0	0	1*	1	0	0
Number of Recruitment Trips	0	7	10	10	15	5	4	
Number of Tours to Granger	2	7	6	8	8	9	3	

* CONM 117 revised to 3 credit course

**Designation eliminated - all students must be in a specific program

***If actively seeking employment

Ferris State University Senior Exit Survey

General Questions

1. With which gender do you identify?
   Male
   Female

2. Are you a veteran?
   Yes
   No

3. Where did you go to high school?

4. Did you attend a career tech center or take building construction courses in high school?
   Yes
   No

5. Did you change majors to construction management?
   Yes
   No

6. Were you a transfer student to Ferris?
   Yes
   No

7. If so, where school did you attend prior to Ferris?

8. What is your semester of graduation?
   Fall
   Spring

9. What is your year of graduation?

10. Do you have a minor or other Bachelor degree?
    Yes, if so, what is it?
    No

Program Questions

11. Do you believe your program met its mission statement?
    The Construction Technology & Management Program's Mission Statement is "To educate students in Building Construction Technology, Civil Engineering Technology, and Construction Management through a broad-based foundation of appropriate 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."

Yes
No

12. Which CONM courses best prepared you for subsequent CONM courses?
    CONM 111 – Construction Practices
    CONM 112 – Plans and Specifications
    CONM 116 Construction Graphics
    CONM 117 – Construction Building Information Technology
    CONM 121 – Materials Properties & Testing
    CONM 122 – Construction Surveying
    CONM 211 – Construction Estimating
    CONM 212 – Soils and Foundations
    CONM 221 – Statics and Structures
    CONM 222 – Construction Administration
    CONM 311 – Formwork
    CONM 312 – Construction Scheduling
    CONM 321 – Cost Estimating
    CONM 324 – Advanced Construction Computer Techniques
    CONM 412 – Construction Contracts
    CONM 413 – Construction Economics
    CONM 424 – Construction Safety & Management

13. Which CONM courses best prepared you for entry into the construction workforce?
    CONM 111 – Construction Practices
    CONM 112 – Plans and Specifications
    CONM 116 Construction Graphics
    CONM 117 – Construction Building Information Technology
    CONM 121 – Materials Properties & Testing
    CONM 122 – Construction Surveying
    CONM 211 – Construction Estimating
    CONM 212 – Soils and Foundations
    CONM 221 – Statics and Structures
    CONM 222 – Construction Administration
    CONM 311 – Formwork
    CONM 312 – Construction Scheduling
    CONM 321 – Cost Estimating
    CONM 324 – Advanced Construction Computer Techniques
    CONM 412 – Construction Contracts
    CONM 413 – Construction Economics
    CONM 424 – Construction Safety & Management
    CONM 499 – Construction Project Management

14. Please indicate which CONM courses need more hands-on experience
    CONM 111 – Construction Practices
    CONM 112 – Plans and Specifications
    CONM 116 Construction Graphics

CONM 117 – Construction Building Information Technology
CONM 121 – Materials Properties & Testing
CONM 122 – Construction Surveying
CONM 211 – Construction Estimating
CONM 212 – Soils and Foundations
CONM 221 – Statics and Structures
CONM 222 – Construction Administration
CONM 311 – Formwork
CONM 312 – Construction Scheduling
CONM 321 – Cost Estimating
CONM 324 – Advanced Construction Computer Techniques
CONM 412 – Construction Contracts
CONM 413 – Construction Economics
CONM 424 – Construction Safety & Management
CONM 499 – Construction Project Management

15. Should there be more hands-on experiences in the program
    Yes. If so, in which classes?
    No

16. Please list any topics you feel are missing/lacking in the program.

Post-Graduation Plans Questions

17. Are you continuing on to graduate school?
    Yes, If yes, what will you be studying
    No

18. Have you accepted a job offer?
    Yes
    No

19. If yes, what is the name of the company?

20. What type of work do they complete? (check all that apply)
    General Contracting
    Construction Management
    Civil – Bridges
    Civil – Roadways
    Civil – Utilities
    Specialty Contractor
    Design-Build
    Testing Agency
    County Road Commission
    MDOT

21. Where is their headquarters located?

22. What is your approximate starting salary?

23. What benefits are included with your job offer?

24. Will you be relocating outside of Michigan?
    Yes. If yes, where?
    No

25. Did you find/meet this company at a Career Fair or evening presentation at the Granger building?
    Career Fair
    Evening Presentation
    Job Posting in the building

26. Did you work for this company in previous summers?
    Yes, how many summers?
    No

27. Do you feel Ferris prepared you well to start your job with this company?
    Yes
    No

Advising Questions

28. Who was your faculty advisor?
    Ferrell Clark
    Bob Eastley
    David Hanna
    John Kantorowski
    Tom Larabel
    Suzanne Miller
    Dan Pratt
    John Schmidt
    Kelly Seitter
    Lee Templin

29. How often did you meet with your faculty advisor for academic, career, or personal matters?
    Once a semester
    Once a month
    As needed

30. My faculty advisor's recommendations were helpful
    Strongly Agree
    Agree

Neither Agree nor Disagree
Disagree
Strongly Disagree

31. How quickly could you arrange a meeting with your faculty advisory or receive an email reply to your question for academic, career, or personal matters?
    Within 1 day
    Within 1 week
    Within 2-3 weeks

32. If you were a transfer student, did you meet with a faculty member before applying to Ferris to help you select the courses you took at your transfer institution?
    Yes
    No

Granger Building Questions

33. Characterize the quality and maintenance of the program's lab equipment

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

34. Characterize the quality and maintenance of the program's lab classrooms

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

35. Please rate the physical quality of the program's classrooms
    Excellent
    Very Good
    Good
    Fair
    Poor

Student Involvement Questions

36. Were you a member of the Associated Construction Students (ACS) group?
    Yes. If yes, did you hold a leadership position?
    No

37. Were you a member of Sigma Lambda Chi?
    Yes. If yes, did you hold a leadership position?
    No

38. Did you participate on a student competition team?
    Yes
    No

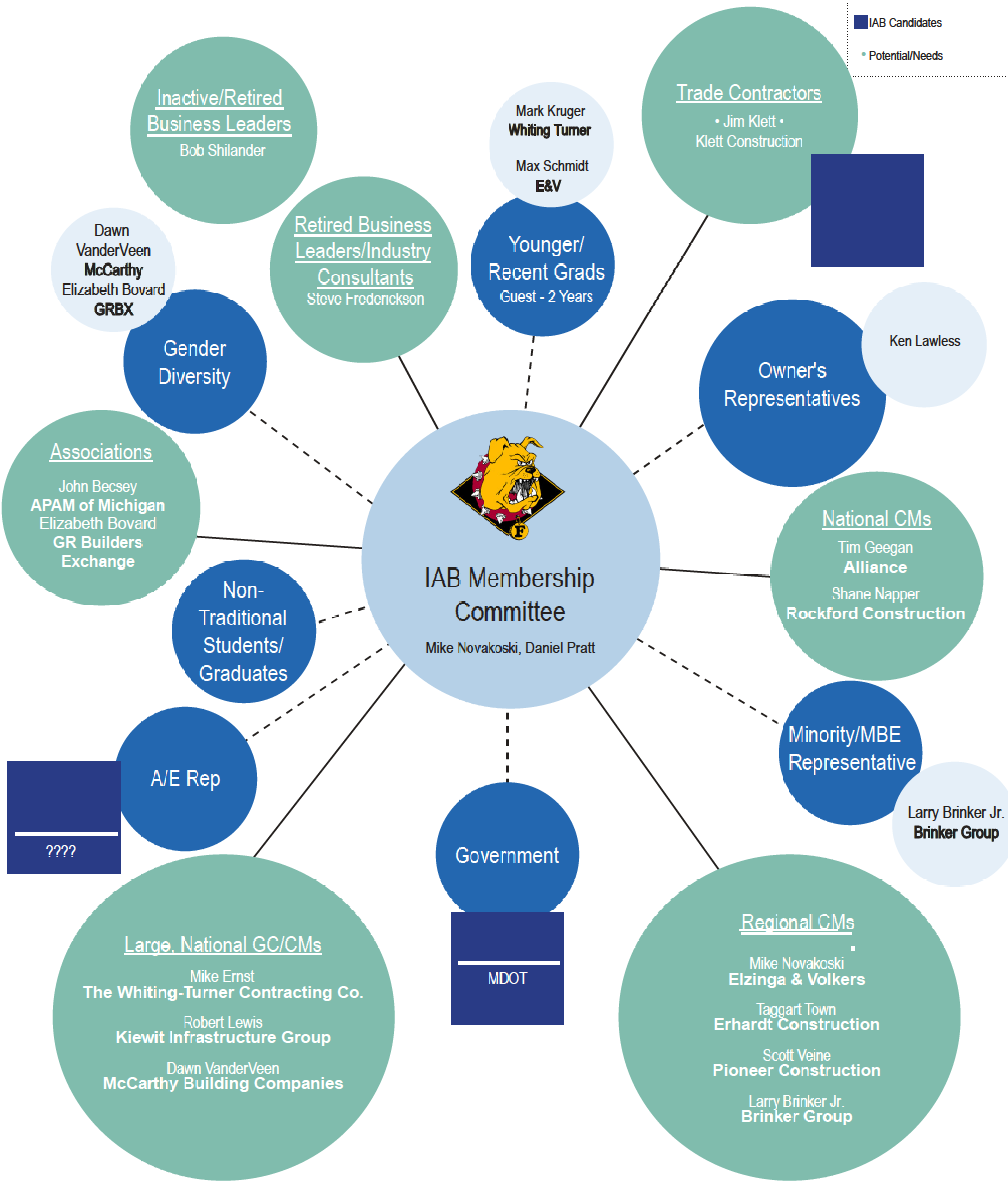
39. If you did participate on a student competition team, which one?
    ASC – Commercial
    ASC – Design-Build
    ASC – Heavy Civil
    ABC
    Estimating competition

40. Did you work part time during the school year?
    Yes
    No

41. Did you take advantage of Sigma Lambda Chi's free tutoring services in the evening?
    Yes
    No

Current and Future Membership Overview Fall 2017

Legend
- Primary Representation
- Secondary Representation
- IAB Candidates
- Potential/Needs



IAB Membership Committee Discussion Items (Fall 2017)
- Updated chart
- Review candidates quali ications summary/background
- Discuss potential new members
- Brainstorm future potential candidates - Chad Comps (AMI) and Andrew Hart (Aldridge Electric)
- Other

Notes:

Ferris State University

Industry Advisory Board Standing Committee Membership 2015 - 2016

EXECUTIVE COMMITTEE

President:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
Vice President:	Steve Frederickson	Past President The Christman Company steve.frederickson@icloud.com 703-740-5654
Program:	Suzanne Miller	605 S. Warren Ave. Big Rapids, MI 49307 SuzanneMiller@ferris.edu 231-591-3024

Ferris State University Industry Advisory Board Committee Members Fall 2017

ACCREDITATION/CURRICULUM COMMITTEE

Chair:	Bob Shilander	Emertus 329 Lakeshore Drive South Holland, MI 49424 bobshilander@charter.net Home: 616-298-7059 or cell: 616-335-0759
Faculty:		
Members:	John Becsey	Asphalt Pavement Association of Michigan 2937 Atrium Drive Suite 202 Okemos, MI 48864 jbecsey@apa-mi.org 517-323-7800 cell: 517-881-4332
	Tim Geegan	Alliance Corporation 728 College Street, Suite A Bowling Green, KY 42101 tgeegan@alliancecorporation.com 270-846-0609 cell: 270-404-0673
	Mike Ernst	Whiting-Turner Contracting Company 300 East Joppa Road Baltimore, MD 21286 michael.ernst@whiting-turner.com 410-821-1100

MEMBERSHIP COMMITTEE

Chair:	Mike Novakowski	Elzinga & Volkers, Inc. 86 East 6th Holland, MI 49423 mikenova@elzinga-volkers.com 616-392-2383
Faculty:	Dan Pratt	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DanielPratt@ferris.edu 231-591-3555
Members:	Larry Brinker, Jr.	BRINKER GROUP 3633 Michigan Avenue Detroit, MI 48216 lbrinkerjr@brinkergroup.com 313-897-9130

Ferris State University Industry Advisory Board Committee Members Fall 2017

DEVELOPMENT COMMITTEE

Chair:	Ken Lawless	Retired, Clark Construction Company Owner's Representative Kglawless44@gmail.com 517-881-1709
Faculty:	Lee Templin	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 Lee_Templin@ferris.edu 231-591-5275
Members:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
	Steve Frederickson	Past President, The Christman Company steve.frederickson@icloud.com 703-740-5654

MENTORING/STUDENT ENHANCEMENT

Chair:	Taggart Town	Erhardt Construction 6060 East Fulton PO Box 208 Ada, MI 49301 ttown@erhardtcc.com 616-676-1222
Faculty:	Dave Hanna	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DavidHanna@ferris.edu 231-591-2680
Members:	Shane Napper	Rockford Construction 601 First Street NW Grand Rapids, MI 49504 snapper@rockfordconstruction.com 616-432-6538
	Scott Veine	Pioneer Construction 550 Kirtland Street, SW Grand Rapids, MI 49507 Scott@pioneerinc.com 616-247-6966
	Dawn Vander Veen	McCarthy Building Companies, Inc. 2859 Paces Ferry Rd., Suite 1400 Atlanta, GA 30339 dvanderveen@mccarthy.com 770-980-8183

IAB Members Unassigned to Subcommittees

Rob Lewis	Robert.Lewis@kiewit.com 972-374-4540
Elizabeth Bovard	Elizabeth@grbx.com

List of Employers That Hire FSU Graduates On A Regular Basis ($25,000 request):

1. Aldridge Electric
2. Barton Malow
3. Clark Construction Company
4. Elzinga & Volkers
5. Erhardt Construction Company
6. Granger Construction
7. Hensel Phelps
8. Hilton Hotels
9. Hyatt Hotels
10. J Ranck Electric
11. Kent Companies
12. Kiewit/TIC
13. MC Industrial/McCarthy
14. OAK
15. Pepper Construction
16. Pioneer Construction
17. R C Hendricks
18. Reith Riley
19. Rockford
20. Spence Brothers
21. The Christman Company
22. Triangle Associates
23. Turner
24. Walbridge
25. Walsh Construction/Archer Western
26. Whiting Turner
27. Wolverine Building Group

Possible letter to them:

Dear ______,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

We are contacting you with a request to consider a year-end contribution opportunity to support a vitally needed element in our Construction Management program.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low with our selection of texts and many handouts used in the classroom. However, our funding for Supplies & Expenses no longer adequately supports a key education element of the student learning process which will result in high student fees.

Ferris State University
Industry Advisory Board

Endowment Campaign Intent

As evidenced with your more recent hires, our program provides graduates who are well prepared to start work immediately. A key reason for this attribute is our program's focus on modern laboratory and site experiential technical learning especially in the first two years of study.

We would like to establish an Experiential Technical Learning endowment for our program to ensure its continued ability to provide our current level of educational experience to our students without having to burden them with additional fees. An endowment would allow the program to annually yield 4% of the principal in the fund while sustaining, and hopefully growing, the principal value. To help put the need into perspective, an endowment of $750,000 would provide the program with $30,000 to put toward material and equipment purchases, class content distribution, and student travel (an amount we are currently spending).

Items that this endowment would cover would include:

- Classroom materials, tools, and equipment in our Practices, Materials, Soils, Framing, Mechanical Practices, and Electrical Practices Labs;
- Class field trips to job sites and suppliers;
- Additional classroom handouts and texts that are helpful for use or reference during the class but are not necessary for a student to purchase;
- Software being used in our multiple computer-related courses (estimating, scheduling, 3D modeling/BIM, VDC, highway technology);
- Maintaining and replacing existing computers, iplan tables; ipads/tablets;
- New technology to utilize into the classroom;
- Professional development opportunities for the students (how to interview; business etiquette, etc)

We would ask you to consider making a donation to the Construction Technology & Management Program Endowed Fund titled "Experiential Technical Learning" to allow us to continue to offer such activities to our students. These added resources will provide students with a leading edge in their early career. -A donation of $25,000 or more would significantly help us approach our goal.

Please contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. You may also use a credit card at the following website:
www.ferris.edu/ctmg/endowment

We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

Endowment Campaign Intent - Fall 2017

List of Contractors Familiar With Our Program Who May Have Hired Some Of Our Students ($10,000 request):

1. 3 Rivers
2. Ajax Paving Industries
3. Alliance
4. Aristeo
5. AZ Schmina
6. Brinkman
7. CR Meyer
8. CSM Group
9. CASS
10. Closner
11. Commercial Contracting
12. DeMaria
13. Devere
14. E and L Construction
15. Elmer's
16. Fischer
17. Gerace
18. Grand River Construction
19. Gundloch Champion
20. Ideal Steel
21. J R Heineman
22. Kramer Group
23. McCarthy and Smith
24. Miller Davis
25. Moore Trosper
26. Obrien Construction
27. Pearson Construction
28. Plante Moran
29. Pumford Construction
30. Schweitzer
31. Serenus Johnson
32. Siwek
33. Skillman
34. Sorenson Gross
35. Tooles Contracting
36. Wieland
37. Wolgast Construction
38. Woods Construction

Possible letter the send to them:

Dear __________,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

We are contacting you with a request to consider a year-end contribution opportunity to support a vitally needed element in our Construction Management program.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low while providing them impactful educational opportunities.

One of the pillars of our education process at Ferris State University is student competitions that offer real-life applications of program knowledge under time-constrained conditions. We currently participate in 4 major student competitions – all of which require travel out of the state: ABC (4 students) and ASC Region 3 Commercial, Design-Build, and Heavy Civil (6 students each). We have experience excellent success to date in all competitions and many students have procured jobs as a result of their participation in the competitions. We also participate in some in-state estimating competitions. Students have stated, "I learned more in this 3 days that I did all year" which is normally countered with "No, you learned how to apply all that you have learned throughout your years at Ferris in 3 days."

We have an established endowment fund for the purpose of supporting student competitions – the Ken Lawless Student Competition Endowed Fund. Earning from this endowment generate approximately $ ____ at its current funding level. The current total cost for participation in our student competitions is $15,000. We would like to grow this endowment so that it alone can fund the student competitions. An endowment allows the program to pull 4% of the principal in a fund in a year while sustaining the principal value – it lasts in perpetuity.

We would like to request that you please consider making a donation to the Ken Lawless Student Competition Endowed Fund to allow us to continue to offer such activities to our students – giving them a leading edge when looking for jobs and representing Ferris as well as they have in the past. A donation of $10,000 would help us approach our goal efficiently.

Alternately, we are also pursuing an endowment to help us keep student costs lower with classroom materials provided by the program. Both endowments are a great opportunity to lend your support to our program.

Feel free to contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. Otherwise, you can use a credit card at the following website: www.ferris.edu/ctmg/endowment We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

List of Contractors or Suppliers That Have Likely Interacted With FSU Grads or Hired Only 1 Graduate ($5,000):

1. Anlaan
2. AMI
3. Applegate Sheet Metal
4. Bay Masonry
5. Bierlin
6. Bracy and Jahr Masonry
7. C A Hull
8. Conti Electric
9. Cunningham Construction
10. Dan's Excavating
11. Dan Vos Construction Company
12. Davenport Masonry
13. Dee Cramer
14. Fastdecks
15. FZ Electric
16. Hardman Construction
17. John E Green
18. Labelle Electric
19. Leidal and Hart Masonry
20. Mackenzie Excavation
21. Motor City Electric
22. Newkirk Electric
23. Pitsch Demolition
24. Schifer Masonry
25. Vos Glass

Possible letter to send to them:

Dear ______,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low while providing them impactful educational opportunities.

We are contacting you with a request to consider a year-end contribution opportunity that we hope you will consider to support a vitally needed element in our Construction Management program - a program whose graduates you have encountered in industry and maybe even hired at some point.

We strive to keep student costs low with our selection of texts and many handouts used in the classroom. However, our funding for Supplies & Expenses no longer adequately supports a key education element of the student learning process which will result in high student fees.

Our program provides graduates who are well prepared to start work immediately. A key reason for this attribute is our program's focus on modern laboratory and site experiential technical learning especially in the first two years of study.

We would like to establish an Experiential Technical Learning endowment for our program to ensure its continued ability to provide our current level of educational experience to our students without having to burden them with additional fees. An endowment would allow the program to annually yield 4% of the principal in the fund while sustaining, and hopefully growing, the principal value. To help put the need into perspective, an endowment of $750,000 would provide the program with $30,000 to put toward material and equipment purchases, class content distribution, and student travel (an amount we are currently spending).

Items that this endowment would cover would include:

- Classroom materials, tools, and equipment in our Practices, Materials, Soils, Framing, Mechanical Practices, and Electrical Practices Labs;
- Class field trips to job sites and suppliers;
- Additional classroom handouts and texts that are helpful for use or reference during the class but are not necessary for a student to purchase;
- Software being used in our multiple computer-related courses (estimating, scheduling, 3D modeling/BIM, VDC, highway technology);
- Maintaining and replacing existing computers, iplan tables; ipads/tablets;
- New technology to utilize into the classroom;
- Professional development opportunities for the students (how to interview; business etiquette, etc)

We would ask you to consider making a donation to the Construction Technology & Management Program Endowed Fund titled "Experiential Technical Learning" to allow us to continue to offer such activities to our students. These added resources will provide students with a leading edge in their early career. -A donation of $25,000 or more would significantly help us approach our goal.

Please contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. You may also use a credit card at the following website: www.ferris.edu/ctmg/endowment

We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

Ferris State University

College of Engineering Technology

Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna, John Kantorowski

Course: BCTM 234 Electrical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for electrical service and distribution, fire protection, building security and signaling, and building automation systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of electrical trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117;

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Ferris State University

College of Engineering Technology

Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues	1

Ferris State University

College of Engineering Technology

Course Outline

No.	Topic	CLO(s)
	C. Code requirements D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

Ferris State University

College of Engineering Technology

Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: BCTM 235 Mechanical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for plumbing, piping, fire suppression and mechanical systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of mechanical and piping trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117; C- or higher in MATH 120/126 or math ACT 26+/SAT 610+

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Ferris State University
College of Engineering Technology

Course Outline

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues C. Code requirements	1

Ferris State University

College of Engineering Technology

Course Outline

No.	Topic	CLO(s)
	D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

Meeting Minutes
October 26, 2017
GRN 105, Granger Building, Big Rapids, MI

Attendees:
John Becsey, (APAM);
Elizabeth Bovard (Grand Rapids Builders Exchange);
Mike Ernst (Whiting Turner);
Steve Frederickson (The Christman Company);
Jim Klett (Klett Construction Company, Inc.);
Mark Krueger (Whiting Turner);
Ken Lawless (Owner's Representative);
Shane Napper (Rockford Construction)
Max Schmidt (Elzinga & Volkers)
Robert Shilander (retired);
Taggart Town (Erhardt Construction);
Dawn Vanderveen (McCarthy)
Scott Veine (Pioneer Construction)

Faculty & Staff
Ferrell Clark
Mark Dyke
Robert Eastley (Director of the School of Built Environment)
David Hanna
Tom Larabel
Jennifer Miller
Suzanne Miller
Dan Pratt
Kelly Seitter
Lee Templin
Shari Wessels

Guests: Dean Larry Schult (in the afternoon)

Items in italics are action items.

1. Introductions

- All IAB members introduced themselves.
- Jennifer Miller was introduced as our new faculty member
- Elizabeth Bovard was introduced as our new IAB member
- Max Schmidt was introduced as our new IAB member – recent graduate

1.a Primary Meeting Objectives

Update on Program since last meeting
Dashboard presentation
Campaign

1.b. IAB Meeting Preparation Documents

IAB Meeting Preparation Documents were emailed out to all IAB members and faculty on October 20. 2017. They included the agenda, a descriptive document of items to be discussed, dashboard, a suggested senior student survey, the membership committee diagram, the IAB Subcommittee Membership roster, the proposed endowment campaign documents and companies we intend to pursue for donations, the outlines for our new mechanical and electrical practices – BCTM 234 and BCTM 235, and the previous meeting minutes..

2. Approved previous meeting minutes (April 28, 2017)

3. Student Feedback Session

50% of the attendees indicated they are interested in being superintendents.

- A new project was requested for CONM 499 – perhaps rotate projects semester by semester
- CONM 499 – throw the students a curveball – push them more – perhaps a change to the schedule
- CONM 112 – new plans and spec requested – did not indicate why
- CONM 212 needs to explain why what they are doing in class is significant – they do not see the value
- CONM 222 requested a more complicated work scope problem
- Wish to learn more about the sequence of work – means and methods backstory
- Requested using MS Project in scheduling class instead of Primavera P6. (Lee explained that MS Project is limited in its capabilities compared to P6)
- Requested that more time be spent on Division 0 items – bonding, payments, etc.
- Requested a list of suggested cultural and social awareness general education courses recommended by our faculty
- CONM 424 should not have 4-5 weeks of presentations – shorten them up. They want to understand more jobsite safety. They like developing the safety plan.
- Want a better understanding of the procurement of materials, management of submittals, and strategies. How to create a submittal log, how to determine the timing required for specific submittal items.
- A preconstruction class could be a good 2-credit 400 level CONM course. We could try it out as an experimental course earlier, although it would not count toward the degree.

4. ACCE accreditation

- Bob Eastley will be attending the February ACCE meeting as our program's representative
- Our accreditation visit will be Fall 2018 so we will be spending the Spring 2018 semester preparing for that.
- We will check to see whether having the certificates is valuable to accreditation
- Bob Shilander indicated that ACCE likes student surveys

5. Program Dashboard

- Increased enrollment numbers are indicated.
- The budget and amount spent per student is also shown. Even with increased enrollment, our budget has remained stagnant
- Grand Rapids will begin a new cohort in Fall 2018 – it will take 3 years to complete
- Student:faculty ratio continues to look worse as enrollment increases.

6. **Program Staffing**

We do have a new hire beginning in January 2018 and have submitted our request for a replacement for John Schmidt's position.

7. **Certificates**

We agreed to rename the 2 program certificates and revise their content or prerquisites. The first certificate will be "Construction Operations". It will consist of CONM 211 Estimating I, CONM 222 Construction Administration, CONM 312 Scheduling, and CONM 321 Estimating II. The prerequisites will continue to be MATH 120, CONM 111 Practices, and CONM 112 Plans and Specifications.
The second certificate will be "Advanced Construction Operations" and will consist of CONM 324 Advanced Computer Techniques, CONM 412 Contracts, and CONM 424 Safety & Management.

8. Student Involvement

At our next meeting we would hold a roundtable session with students and IAB members similar to what HVACR does with their IAB. Students would submit questions before the meeting and then they would rotate to different IAB member tables.

9. A New, Temporary IAB Subcommittee

Discussed the creation of a Recent Graduate Committee to develop a 2-year post-graduation survey to determine what graduates believe they need from the program once they have been in industry for 2 years. The student feedback session has only contained feedback about how students currently feel about classes and may not reflect what they truly learned in them until they have worked for a while.
Steve, Scott, and Shane agreed to work together to create such a survey.

10. Previous Student Feedback Request Regarding Soft Skills

Discussed the use of the IAB to continue to help students with soft skills
Lee indicated that the English department has offered to create a unique ENGL 321 section just for our students that would focus on technical writing, email etiquette, and communication skills. *The program will pursue with the English department.*

11. Proposed Student Survey

After much discussion, it was determined that the advising and program questions are not needed. The remaining questions help us to understand our students and will help with ACCE accreditation, per Bob Shilander. *Question 10 will be revised to ask whether a student has a minor or other Associate's or Bachelor degree*.
The questions will be joined with the survey questions Dave issues to his CONM 499 class. *A new version will be emailed to the IAB and faculty.*

12. Course Review

- Dave requested that IAB members give him some case studies to use in our new ethics and professionalism class
- It was suggested that the following be added to the Course Learning Outcomes for both BCTM 234 and 235:
    - Understand material components and acquisition times

  - Understand schedule implications of a contractor not continuously on site and their necessary "work-arounds"
  - Logistics, pre-assembly, and 2nd shift/off-shift practices (how equipment gets to the site, what to do if equipment shows up early on the site)
- Commissioning should be added to both courses
- There should be a focus on the practices of successful contractors
- There should be a focus on the front ends/planning/work scopes
- Review what owner may/may not provide o typical projects
- Both classes should tie to the VDC class
- Include low voltage in the course description for CONM 234

13. Campaign

It was determined that we need to pursue an endowment campaign. The list of contractors was reviewed and HDR Engineering, Black and Veatch, Erickson Crane, and The Accident Fund will be added to the list. AMI and Vos Glass are related.

More donation tiers were suggested

Naming opportunities should be mentioned

The letter will be revised – Ken, Lee, and Suzanne will work on it and include it with these meeting minutes. It is our intention to get it out before the end of the year so that companies that may be looking to use some of their cash have the opportunity to do so.

14. Dean Larry Schult

Overall University enrollment is down. Budgets have been decreased for all colleges*. Larry indicated that he will be fair with budget reductions across all 4 schools and that he is looking at a new budget model to tie it to enrollment.*

We are preparing for our University accreditation visit from HLC in 2020. There will be a focus on instructors having the proper credentials for the classes they teach. There is no established plan at this time if an instructor does not meet the teaching requirements.

15. Recent Graduate Feedback – Mark Krueger and Max Schmidt

- The visualization course was very helpful
- SketchUp (taught in the program) is a program they use often in industry
- Estimating classes are very helpful – you get out of it what you put into it
- Need a greater emphasis on work scopes
- Scheduling class was very helpful
- Learned most of their people skills and work environment skills with their extra-curricular activities such as SCAN, ACS, competitions, bid simulations
- Mark's boss indicated that as an employee, Mark has a practical knowledge that has paced him a few steps ahead of other school graduates which allows him to learn the company nuances
- They would like to learn more about bid analysis, work scopes, MEP, and how to deal with changes

16. ICET

ICET had a good last year and enrollment so far this year appears to be similar to last year.
MDOT has put out a request for proposal for an Aggregate Training Manager and a Hot Mix Training Manager – Aggregate is due in December while Hot Mix is due in February. Tom is preparing to respond to both. Part of the response will require that we acknowledge our facilities and their need for improvement.
We need a new bituminous lab on the ICET campus – which we also use for some CETM 214 labs. This will be a separate campaign from the endowment campaign. For that reason, the endowment campaign will not include paving contractors
The new lab would take the current hot mix asphalt equipment from the Klett lab in the Granger building and move it to the new lab. This would open up the soils lab to be used for Mechanical and Electrical practices more easily

17. Subcommittees:

IAB Membership

- Brendan Pudduck will be our new recent graduate next year when Mark Krueger rotates off the IAB.
- It appears that Kim Ridings and Tim Geegan have been unable to attend meetings should be moved to emeritus status.
- *Ken Lawless will approach Chad Comps from AMI regarding possible membership*
- *Suzanne will approach Andrew Hart from Aldridge Electric regarding possible membership*

Development Committee –

- Ken Lawless has assumed the Chair position of this committee. It now consists of Ken, Lee, and Suzanne
- See previous discussion regarding the endowment campaign

Mentoring/Student Enhancement Committee –

- The committee has developed a guideline for a CONM Program Mentoring Network that the Committee intends to implement starting with Sigma Lambda Chi Members. Ultimately they would like to expand it to the junior year students. See attachment included with theses meeting minutes. *We need to determine whether the Ferris name can be used in conjunction with it.*
- Upcoming topics for our students include: contract issues, sequencing, and staying on schedule
- Elizabeth was recruited to this committee

Accreditation/Curriculum Committee –

- Bob Eastley was added as the faculty representative to this committee
- Will be preparing to help with Transfer Guides and the upcoming ACCE visit

18. Other

The IAB Committee Membership Roster has been revised and is attached to these meeting minutes

19. Next Meeting Scheduled

Next Meeting is set for Friday, April 27th to coincide with the last day of classes and our student awards luncheon. The Construction Management Program Golf Outing will be held Saturday, April 28th at Falcon Head Golf Course in Big Rapids. All are welcome to participate. Please contact Lee Templin for more information.

20. Meeting adjourned at 4:30 pm.

Respectfully submitted,

Suzanne Miller
Program Coordinator
Construction Technology and Management Programs

Ferris State University Senior Exit Survey

Dear Graduating Senior,

You are asked to complete the following survey as a requirement of our program to assess your educational outcomes. In addition, the program wishes to improve our performance and be responsive to student recruitment and needs - you can help us do so.

A portion of this survey will serve as an indirect assessment of our Bachelor of Science in Construction Management degree and Ferris State University and input to our accreditation reports with the American Council for Construction Education (ACCE). The remaining questions are for internal use by our program toward our continuous improvement process.

It will take approximately 20 minutes to complete the questionnaire. Your participation in this study is completely voluntary. There are no foreseeable risks associated with this survey. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Professor Hanna or Professor Miller.

Thank you very much for your time and support.

General Questions

1. With which gender do you identify?
   Male
   Female

2. Are you a veteran?
   Yes
   No

3. Where did you go to high school?

4. Did you attend a career tech center or take building construction courses in high school?
   Yes
   No

5. Did you change majors to construction management?
   Yes
   No

6. Were you a transfer student to Ferris?
   Yes
   No

7. If so, where school did you attend prior to Ferris?

8. What is your semester of graduation?
   Fall
   Spring

9. What is your year of graduation?

10. Do you have a minor or other Associate's or Bachelor degree?
    Yes, if so, what is it?
    No

Program Questions

The following questions relate to the 20 Student Learning Outcomes identified by the ACCE. Please use the scale of 1 (FSU did a Poor job) to 10 (FSU did an Outstanding job) to identify how well your education here at Ferris State University has prepared you for your perceived employment needs in that field.

The first set of SLOs begin with the word *Create*. **Create** is the highest level of learning. At this level students should be producing new ideas or products that integrate the knowledge they have gained. When students are involved in creating new artifacts, they are actively engaged in the subject matter.

SLO #1: Create written communication appropriate to the construction discipline

Poor Outstanding

1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #2: Create oral presentations appropriate to the construction discipline

Poor Outstanding

1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #3: Create a construction project safety plan

Poor Outstanding

1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #4: Create construction project cost estimates

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #5: Create construction project schedules

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

The next set of SLOs begin with the word *Analyze. Analyze* is a medium level of learning. At this level students should begin to develop higher order thinking. They may be asked to compare and contrast or take a concept and break it into parts to explore the relationships present.

SLO #6: Analyze professional decisions based on ethical principles

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #7: Analyze construction documents for planning and management of construction processes

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #8: Analyze methods, materials, and equipment used to construct projects

Poor									Outstanding
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

The next set of SLOs begin with the word Apply. Apply is a medium level of learning, just below Analyze. At this level, students begin to put the information they are learning into context. Here they are able to integrate ideas acreoss multiple situations or utilize the content in a new way.

SLO #9: Apply construction management skills as a member of a multidisciplinary team

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10

SLO #10: Apply electronic-based technology to manage the construction process

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10

SLO #11: Apply basic surveying techniques for construction layout and control

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10

The final set of SLOs begin with the word *Understand*. *Understand* is a lower level of learning, just above the lowest level of Remember. At this level, students demonstrate that they understand the content by explaining, summarizing, classifying, or translating the given information.

SLO #12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10

SLO #13: Understand construction risk management

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10

SLO #14: Understand construction accounting and cost control

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #15: Understand construction quality assurance and control

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #16: Understand construction project control processes

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #17: Understand the legal implications of contract, common, and regulatory law to manage a construction project

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #18: Understand the basic principles of sustainable construction

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #19: Understand the basic principles of structural behavior

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

SLO #20: Understand the basic principles of mechanical, electrical, and piping systems

Poor								Outstanding	
1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

11. Should there be more hands-on experiences in the program
    - Yes. If so, in which classes?
    - No

12. Please list any topics you feel are missing/lacking in the program.

Post-Graduation Plans Questions

13. Are you continuing on to graduate school?
    - Yes, If yes, what will you be studying
    - No

14. Have you accepted a job offer?
    - Yes
    - No

15. If yes, what is the name of the company?

16. What type of work do they complete? (check all that apply)
    - General Contracting
    - Construction Management
    - Civil – Bridges
    - Civil – Roadways
    - Civil – Utilities
    - Specialty Contractor
    - Design-Build
    - Testing Agency
    - County Road Commission
    - MDOT

17. Where is their headquarters located?

18. What is your approximate starting salary?

19. What benefits are included with your job offer?

20. Will you be relocating outside of Michigan?
    Yes. If yes, where?
    No

21. Did you find/meet this company at a Career Fair or evening presentation at the Granger building?
    Career Fair
    Evening Presentation
    Job Posting in the building

22. Did you work for this company in previous summers?
    Yes, how many summers?
    No

23. Do you feel Ferris prepared you well to start your job with this company?
    Yes
    No

Granger Building Questions

24. Characterize the quality and maintenance of the program's lab equipment

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

25. Characterize the quality and maintenance of the program's lab classrooms

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

26. Please rate the physical quality of the program's classrooms
    Excellent
    Very Good
    Good
    Fair
    Poor

Student Involvement Questions

27. Were you a member of the Associated Construction Students (ACS) group?
    Yes. If yes, did you hold a leadership position?
    No

28. Were you a member of Sigma Lambda Chi?
    Yes. If yes, did you hold a leadership position?
    No

29. Did you participate on a student competition team?
    Yes
    No

30. If you did participate on a student competition team, which one?
    ASC – Commercial
    ASC – Design-Build
    ASC – Heavy Civil
    ABC
    Estimating competition

31. Did you work part time during the school year?
    Yes
    No

32. Did you take advantage of Sigma Lambda Chi's free tutoring services in the evening?
    Yes, regularly
    Yes, sometimes
    No, never

Thank you for taking the time to complete this survey.

Ferris State University

Industry Advisory Board Membership and Standing Committee Membership 2017 - 2018

ALL MEMBERS

John Becsey	APAM
Larry Brinker	Brinker Group
Elizabeth Bovard	Grand Rapids Builders Exchange
Mike Ernst	Whiting Turner
Steve Frederickson	Past President, The Christman Company; Innovative World Solutions
Jim Klett	Klett Construction Company, Inc.
Mark Krueger	Whiting Turner (recent graduate)
Ken Lawless	Owner's Representative
Rob Lewis	Kiewit
Mike Novakoski	Elzinga & Volkers
Shane Napper	Rockford Construction
Max Schmidt	Elzinga & Volkers (recent graduate)
Robert Shilander	Retired
Taggart Town	Erhardt Construction
Dawn Vanderveen	McCarthy
Scott Veine	Pioneer Construction

EXECUTIVE COMMITTEE

President:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
Vice President:	Steve Frederickson	Past President - The Christman Company Innovative World Solutions 44050 Ashburn Plaza, Suite 195-656 Ashburn, VA 20147 steve@innovativeworldsolutions.com 703-217-7688
Program:	Suzanne Miller	605 S. Warren Ave. Big Rapids, MI 49307 SuzanneMiller@ferris.edu 231-591-3024

Ferris State University Industry Advisory Board Committee Members Fall 2017

ACCREDITATION/CURRICULUM COMMITTEE

Chair:	Bob Shilander	Emeritus 329 Lakeshore Drive South Holland, MI 49424 bobshilander@charter.net Home: 616-298-7059 or cell: 616-335-0759
Faculty:	Bob Eastley	605 S. Warren Ave. Big Rapids, MI 49307 RobertEastley@ferris.edu 231-591-2369
Members:	John Becsey	Asphalt Pavement Association of Michigan 2937 Atrium Drive, Suite 202 Okemos, MI 48864 jbecsey@apa-mi.org 517-323-7800 cell: 517-881-4332
	Mike Ernst	Whiting-Turner Contracting Company 300 East Joppa Road Baltimore, MD 21286 michael.ernst@whiting-turner.com 410-821-1100

MEMBERSHIP COMMITTEE

Chair:	Mike Novakowski	Elzinga & Volkers, Inc. 86 East 6th Holland, MI 49423 mikenova@elzinga-volkers.com 616-392-2383
Faculty:	Dan Pratt	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DanielPratt@ferris.edu 231-591-3555
Members:	Larry Brinker, Jr.	BRINKER GROUP 3633 Michigan Avenue Detroit, MI 48216 lbrinkerjr@brinkergroup.com 313-897-9130

DEVELOPMENT COMMITTEE

Chair:	Ken Lawless	Retired, Clark Construction Company Owner's Representative Kglawless44@gmail.com 517-881-1709
Faculty:	Lee Templin	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 Lee_Templin@ferris.edu 231-591-5275
Members:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
	Steve Frederickson	Past President, The Christman Company Innovative World Solutions steve@innovativeworldsolutions.com 703-217-7688

MENTORING/STUDENT ENHANCEMENT

Chair:	Taggart Town	Erhardt Construction 6060 East Fulton PO Box 208 Ada, MI 49301 ttown@erhardtcc.com 616-676-1222
Faculty:	Dave Hanna	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DavidHanna@ferris.edu 231-591-2680
Members:	Shane Napper	Rockford Construction 601 First Street NW Grand Rapids, MI 49504 snapper@rockfordconstruction.com 616-432-6538
	Scott Veine	Pioneer Construction 550 Kirtland Street, SW Grand Rapids, MI 49507 Scott@pioneerinc.com 616-247-6966
	Dawn Vander Veen	McCarthy Building Companies, Inc. 2859 Paces Ferry Rd., Suite 1400 Atlanta, GA 30339 dvanderveen@mccarthy.com 770-980-8183
	Elizabeth Bovard	678 Front Ave. NW, Suite 330 Grand Rapids, MI 49504 Elizabeth@grbx.com 616-949-8650

IAB Members Unassigned to Subcommittees

	Rob Lewis	Robert.Lewis@kiewit.com 972-374-4540

December 1, 2017

Dear _______________________,

2017 has been a positive year for both the construction industry and our Ferris Construction Technology & Management Program. Program recruiting efforts have paid off, yielding a much higher application rate and acceptances. The internships and career opportunities from our corporate partners enhance our reputation.

As you are aware, our program provides graduates who are prepared to start work immediately. A key reason is our program's focus on modern laboratory and worksite experiential technical learning. We will be leveraging this knowledge with new courses in Mechanical Construction Practices and Electrical Construction Practices and a continuing emphasis on technology in our computer labs.

Complementing our students' education on-campus are opportunities for students to participate in competitions that offer real-life application of program knowledge under time-constrained conditions.
Our students currently participate in 4 major industry-recognized, student competitions. We have been highly successful in all competitions and many students' job offers have been influenced by their competition experience.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low while providing them impactful educational opportunities. However, our present funding no longer adequately supports some fundamental elements of the student learning process that will translate into high student fees.

To enable us to continue with this fundamental experiential learning approach and with the support of our Industry Advisory Board (IAB), we would like to establish a $1,000,000 Construction Management Experiential Technical Learning Endowment. In an era where educational-related costs are increasing and educational state funding is decreasing, this endowment will benefit all students in the program. Endowments are invested with The Ferris Foundation and held in perpetuity. The interest earned from a fully funded endowment is distributed annually for its designated used. Based on the anticipated growth of a fully funded $1,000,000 endowment, the Construction Management Experiential Technical Learning Endowment could grow significantly, yielding $40,000 in its very first year to fund the needs listed below.

- Classroom materials, tools, and equipment in our Practices, Materials, Soils, Framing, Mechanical Practices, and Electrical Practices Labs
- Class field trips to job sites and suppliers
- Student competitions
- Additional classroom handouts and texts that are helpful for use or reference during the class but are not necessary for a student to purchase
- Software being used in our multiple computer-related courses (estimating, scheduling, 3D modeling/BIM, VDC, highway technology)
- Maintaining and replacing existing computers, iplan tables, ipads/tablets, surveying equipment
- New technology to utilize into the classroom
- Development of laboratory activities
- Professional development opportunities for the students (how to interview; business etiquette, etc)

We would ask you to consider making a donation to the Construction Technology & Management Program Endowed Fund titled "Construction Technology & Management Experiential Technical Learning Endowment". The added resources generated by the fund will enable us to continue to provide students with leading edge knowledge they will use directly as they launch their careers. -We have structured donation recognition into five categories.

- Platinum $40,000 and above
- Gold $20,000 to $39,999;
- Silver Level $10,000 to- $19,999
- Bronze Level $5,000 to $9,999

There are also room naming opportunities available upon request.

We will be reaching out to you in the very near future to discuss how you can make an impact, however please feel free to contact any of us at any time.

On behalf of the Construction Technology and Management Program, thank you very much for your support and consideration.

Robert Eastley	Director of the School of Built Environment	231-591-2369
Suzanne K. Miller	Professor and Program Coordinator	231-591-3024
Ken Lawless	Retired Industry, Chair of the IAB Development Committee	517-881-1709
Lee Templin	Faculty, IAB Development Committee	231-591-5275

Ferris State University

Construction Technology and Management Industry Advisory Board Agenda

October 26, 2017

10:15 – 11:00 am	Meet and Greet with Industry Advisory Board Members, Faculty, Student Organization Representatives– coffee provided
11:00 – 12:00 pm	IAB Session with Students
12:00 – 12:45 pm	**Lunch**
12:45 – 2:30 pm	Introductions of IAB members Review of student feedback session Review and approve previous meeting minutes Update on what is happening within the program Review of dashboard information Industry support of new mechanical and electrical practices courses Review of IAB Meeting Preparation Content not called out specifically below
2:30 - 2:45 pm	**Break**
2:45 – 3:15 pm	Campaign for the Construction Technology & Management Program
3:15 – 3:45pm	New graduate survey review
3:45 – 4:00 pm	Dean Larry Schult Q&A
4:00 – 4:15 pm	Recent Graduate IAB Member Report to the IAB (Mark Krueger and Max Schmidt)
4:15 – 4:20 pm	ICET Update
4:20 – 4:45pm	Standing Committee Updates
4:45pm	**Adjourn**

Agenda – Fall 2017

IAB Meeting Preparation

October 26, 2017

GRN 105, Granger Building, Big Rapids, MI

PRE-MEETING PREPARATION STRATEGY

In order to enable more time for dialogue between IAB members and our faculty representatives, we are providing the following summary of important information relative to planned discussion plus documents that should be reviewed prior to the meeting to facilitate an efficient and effective IAB discussion. Please review the attached documents and agenda. We are looking forward to a very effective and enjoyable meeting.

PREVIOUS MEETING MINUTES

The Spring 2017 IAB Meeting Minutes are included separately in this email for you to review prior to approving them at this Fall 2017 meeting.

ACCE ACCREDITATION

We received formal approval for the delay of our accreditation visit. The new visit will occur in Fall 2018. The report will be due June 1, 2018. We will be sending out alumni, employer, and IAB member surveys in the spring for the report. The Accreditation/Curriculum Subcommittee will be involved with this process, as will the IAB overall.

DASHBOARD

You will notice from the dashboard that our enrollment numbers continued to be strong. For Fall 2017 our entry class was the same size as last year. Transfers continue to account for over 30% of our student body.

Overall, enrollment has decreased at the University. Accordingly the entire University was faced with budget cuts, so our budget will not increase, despite our increase in program enrollment.

STAFFING

Current - We hired a new faculty member, Jen Miller, two weeks before classes began. Jen came to us from the City of Saginaw's Engineering Department. She received her BS in Civil Engineering from Michigan Tech and is a Registered Engineer. She has spent time with both contractors and design agencies, focused on both commercial and heavy civil construction. She is teaching one of the lectures/labs of CONM 121 Materials Properties & Testing, CONM 221 Statics & Structures, and CONM 311 Formwork and Temporary Structures.

As indicated earlier in the semester, John Schmidt retired two weeks before classes began. We were able to cover his classes with Dan Pratt and Suzanne Miller accepting overloads as well as having a Manufacturing Professor offer another section of his MFGE 423 Engineering Economics course (to replace our CONM 413 Construction Economics) for the semester.

We have a viable schedule for the Spring 2018 semester. However, many faculty are still on overload; a new faculty member is incorporated into the mix; and 2-3 anticipated adjuncts teaching Cost Estimating in Big Rapids as well as our Professional Methods (Sustainability) course in Grand Rapids are included. We have found an acceptable candidate for the Cost Estimating course in Big Rapids and are currently working through the hiring process.

Future - We hired a new faculty member in the middle of September. He comes to us from the power industry with a BS in Mechanical Engineering and an MS in Electrical Engineering. In the spring, he is scheduled to teach BCTM 223 Mechanical/Electrical Plans and Specifications, CONM 413 Engineering Economics, and CONM 112 Plans and Specifications. In the future, he will be responsible for developing and teaching our new BCTM 235 Mechanical Construction Practices course and BCTM 234 Electrical Construction Practices course.

Despite the University budget cuts, we received approval to replace John Schmidt. The advertisement will be going out within the week with interviews scheduled to begin in January. The job posting will remain open until filled. We are looking for an all-around individual with computer software knowledge (particularly 3-D modeling). We anticipate a Fall 2018 start for this individual.

CONM CERTIFICATES

We currently have only 1 certificate – Construction Administration. This covers CONM 211 Estimating I, CONM 222 Construction Administration, CONM 312 Scheduling, and CONM 321 Construction Estimating II. It required Trigonometry, CONM 111 Construction Practices, and CONM 112 Plans and Specifications as prereqs to the courses. (CONM 116 is a prerequisite to CONM 112). Realistically, it can take a student 5 semesters to complete the certificate if they do not have a construction background.

We closed the other certificate – Advanced Construction Management because we eliminated CONM 423 Professional Methods (Sustainability) from the program in its current form as it required an additional prerequisite (CONM 117). The certificate used to require CONM 324 Advanced Computer Techniques, CONM 412 Contracts, CONM 424 Safety & Management, and CONM 423 Professional Methods.

Only 6 credits are traditionally required for a certificate. The faculty have determined that we would like to resurrect the Advanced Construction Management certificate with just CONM 324, 412, and 424.

We also propose renaming the certificates “Certificate – Construction Operations” and “Certificate – Advanced Construction Operations”.

STUDENT INVOLVEMENT

At our Spring 2017 meeting, we decided that at our next meeting we would hold a roundtable session with students and IAB members similar to what HVACR does with their IAB. Students would submit questions before the meeting and then they would rotate to different IAB member tables. This suggestion will begin in Spring 2018 which will make for a tight schedule with the student awards and scholarships luncheon, however, it does give the IAB a second opportunity to speak with students during the school year.

PROPOSED STUDENT EXIT SURVEY

We are suggesting a new student exit survey that will help us with our accreditation report and to help ensure we are getting adequate feedback from students – it is in a rough form but it should be implemented this semester to help with our accreditation. It is based on a survey from Ohio State University that John Schmidt reviewed on one of his accreditation visits and indicated it was a good survey for accreditation.

Please take the time to review the attached survey for the meeting. We will discuss your comments during the meeting. If extensive, we would appreciate your mark ups to facilitate modifying the survey.

MATH 132 – CALCULUS FOR BUSINESS

The faculty met with the primary math instructor for MATH 132 Calculus for Business. She explained how she has been slowly changing the course. It is the Math Department's intention to revise this course's content and name since it is only taken by construction management and elementary education students – one title we discussed was "Geometric Calculus" as we requested an emphasis on geometry. Due to our increased enrollment, and to give her more time to develop the course, the Math Department added another section of the course. The instructor requested sample homework problems from our faculty to understand what we demand of our students and help her develop the course. Any ideas you may have would be appreciated.

STUDENT FEEDBACK REQUEST

Students requested more opportunity to learn communication skills (Mock phone calls, mock meetings, how to deal with these types of situations) – submittal of ideas from the IAB to consider was assigned to the Mentorship Subcommittee at the Spring 2017 meeting. A verbal report or written comments would be appreciated.

NEW RECENT-GRADUATE MEMBER OF THE IAB

The faculty unanimously voted Max Schmidt to be our new recent-graduate member of the IAB as Mark Krueger transitions to his 2nd year. Max is employed by Elzinga & Volkers.

Faculty also received a request from a student to be considered as the recent graduate representative on the IAB (starting Fall 2018). We discussed it and agreed that Brendan Pudduck will be an excellent recent graduate representative on the IAB.

TRANSFER STUDENT GUIDES

Suzanne has been working on transfer course guidelines for some of Michigan's community colleges. Transfer students tend to require a large number of credits to graduate with our degree when they pursue the AAS elsewhere. Selected transfer guides are being provided to the Accreditation/Curriculum Subcommittee for their review.

MEMBERSHIP

The membership rotation should be reviewed to determine whose membership term is up for renewal.

Elizabeth Bovard was voted in as a member of the IAB at the Spring 2017 meeting.

We have discussed Chad Comps from AMI and Andrew Hart from Aldridge Electric as possible candidates. If you have any others, please bring their names and contact information with you to the meeting.

SUBCOMMITTEE MEMBERSHIP

Membership on our subcommittees should be reviewed as we have had some faculty and membership changes.

- Accreditation/Curriculum needs a faculty member on it
- Ken Lawless has agreed to step in as the Chair of the Development committee. His status has been revised to Owner's Representative.
- Rob Lewis and Elizabeth Bovard are not member of a subcommittee
- Do any IAB members wish to change committees?

CAMPAIGN FOR THE CONSTRUCTION TECHNOLOGY & MANAGEMENT PROGRAM

At our last meeting we ran through the numbers and indicated that the Program consistently overspends its budget by $30,000, despite best efforts at controlling costs. The most significant costs contributing to the overrun are in the Supply & Expenses (S&E) budget and include approximately $16,000 for materials used in the labs, $13,000 for student travel, and $12,000 for course-related copies. Faculty travel to industry organization meetings and professional development designed to keep us up-to-date with our teaching and topics has been limited due to the lack of available funds. This will impact us negatively on our Accreditation visit.

We agreed at the spring meeting that we should pursue the creation of an endowment provide needed funds for S&E and professional development. An endowment with a value of $750,000 would give us a 4% return annually of $30,000. This would essentially cover our program's overrun as it stands currently.

We believe it would be prudent to pursue the companies that typically hire our students to aid us with creating the larger portion of the endowment. It would take 38 companies donating $20,000 each to reach $750,000.

3 tiers of contractors/suppliers have been created as target donors. The 1st and 3rd tier are focused to help with educational expenses that would otherwise have to be passed on to the students. The 2nd tier is targeted to bolster the existing student competition endowment.

While each tier has a requested amount, we would likely enable the "return" card to also show lower amounts, a blank for them to write in an amount, and also the option to pledge 50% this year and 50% next year.

We would like the IAB's view on the endowment campaign, the targeted companies, the targeted amount, and the approach we should consider to maximize our success.

COURSE REVIEW

We would like to start reviewing course content in depth with the IAB at each meeting – looking at 2-3 classes at each meeting. At the Spring 2018 meeting our new faculty member should be able to expand upon how he intends to proceed with the new mechanical and electrical courses (BCTM 234 and BCTM 235). We will be looking for some feedback from the IAB at that time.

The faculty would like to present CONM 116 Construction Graphics and our new course CONM 373 Professionalism and Ethics in Construction at the Spring meeting as we look to implement and change those courses.

Kelly Seitter would like some input regarding the drafting/modeling software being used by the heavy civil industry. AutoCAD has changed a lot from its earlier days and if there is a different software that industry is using, she would be happy to switch to that program instead.

Is the IAB pleased with this course review array and are there any other courses the IAB would like to suggest for future IAB discussion?

MECHANICAL/ELECTRICAL PRACTICES COURSES

We will be needing industry support for the development of our 2 new mech/elec practices courses – specifically with the lab portion. We are intending to use the HVAC Fabrication Lab for the first year as our new instructor develops the 2 courses. Ultimately, we may move the Soils Lab into the Materials Lab to open up the space for the mechanical and electrical labs. It would improve the use of both labs.

We could use some industry contacts to pursue for help with possible used equipment, tools, materials, etc. How can we most efficiently provide information to you to determine if such equipment is available?

Ideas on what should be targeted in the classes will also be appreciated. The two outlines are included with the packet for your review.

Ferris State University Construction Technology and Management Programs	2017-2018 Fall Only	2016-2017	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012	2010-2011
Freshman Class Size (Fall semester) CONM 100	42	38	38	35	32	19	21	25
Freshman Class Size (Both Semesters) CONM 116	70	73	65	46	59	49	59	40
Total Students	274	260	249	220	223	220	253	289
BCTM	152	126	75	18	15	13		
CETM	28	24	20	14	9	9		
CONM	94	108	143					
"Pre-" CONM or BCTM or CETM**	0	12	11	9	6	12		
Enrollment % Change From Prior Year	105%	104%	113%	99%	101%	87%	88%	87%
Number of Female students	15	14	14	11				
Number of Minority students	22	24	29	29	33			
Number of Veteran students		10	7	7				
Number of Degrees Conferred								
CONM		48	54	38	42	71	63	69
BCTM (Associates)		42	11	33	25	40	38	37
CETM (Associates)		12	6	12	13	12	20	20
Certificates		0	0	2	0	3	0	3
Number of Faculty (Full-time)	7.75	7.25	7.75	8	10	11	11	11
Number of BCTM courses (not sections) taught Fall and Spring	4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
Number of CETM courses (not sections) taught Fall and Spring	2	2 2	2 2	2 2	2 2	2 2	3 2	3 2
Number of CONM courses (not sections) taught Fall and Spring	23 23	24 23	24 23	24 23	24 23	24 23	23 22	23 22
# of courses per faculty member - Fall and Spring			3.9	3.75	3	2.72	2.72	2.72
Program Budget	$44,400.00	$44,400.00	$49,406.00	$49,406.00	$49,406.00	$57,128.00	$67,332.00	$75,130.00
Program Reimbursement (Professional Development, ABC, GR Incentive)		$14,872.20						
Program Expenses		$74,211.11	$75,420.00	$77,262.27	$64,983.35	$83,426.00	$93,228.00	$95,114.00
Budget Per Student	$162.04	$170.77	$198.42	$224.57	$221.55	$259.67	$266.13	$259.97
Expenses Per Student		$285.43	$302.89	$351.19	$291.41	$379.21	$368.49	$329.11
Budget % Change from Prior Year	0.0%	-10.1%	0.0%	0.0%	-13.5%	-15.2%	-10.4%	
Student to Faculty Ratio	35.4:1	35.9:1	32.6:1	27.5:1	23:1	23:1	23:1	26:1
Placement % at graduation (within 4 months)***		95% (100%)	96% (100%)	92% (100%)	95% (100%)	91% (100%)		65%
Average Graduate Salary		$56,500.00	$55,000	$50,579	$48,237	$48,166		$37,928
New Courses Added	0	0	0	0	1*	1	0	0
Number of Recruitment Trips	0	7	10	10	15	5	4	
Number of Tours to Granger	2	7	6	8	8	9	3	

* CONM 117 revised to 3 credit course

**Designation eliminated - all students must be in a specific program

***If actively seeking employment

Ferris State University Senior Exit Survey

General Questions

1. With which gender do you identify?
   Male
   Female

2. Are you a veteran?
   Yes
   No

3. Where did you go to high school?

4. Did you attend a career tech center or take building construction courses in high school?
   Yes
   No

5. Did you change majors to construction management?
   Yes
   No

6. Were you a transfer student to Ferris?
   Yes
   No

7. If so, where school did you attend prior to Ferris?

8. What is your semester of graduation?
   Fall
   Spring

9. What is your year of graduation?

10. Do you have a minor or other Bachelor degree?
    Yes, if so, what is it?
    No

Program Questions

11. Do you believe your program met its mission statement?
    The Construction Technology & Management Program's Mission Statement is "To educate students in Building Construction Technology, Civil Engineering Technology, and Construction Management through a broad-based foundation of appropriate 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."

Yes
No

12. Which CONM courses best prepared you for subsequent CONM courses?
CONM 111 – Construction Practices
CONM 112 – Plans and Specifications
CONM 116 Construction Graphics
CONM 117 – Construction Building Information Technology
CONM 121 – Materials Properties & Testing
CONM 122 – Construction Surveying
CONM 211 – Construction Estimating
CONM 212 – Soils and Foundations
CONM 221 – Statics and Structures
CONM 222 – Construction Administration
CONM 311 – Formwork
CONM 312 – Construction Scheduling
CONM 321 – Cost Estimating
CONM 324 – Advanced Construction Computer Techniques
CONM 412 – Construction Contracts
CONM 413 – Construction Economics
CONM 424 – Construction Safety & Management

13. Which CONM courses best prepared you for entry into the construction workforce?
CONM 111 – Construction Practices
CONM 112 – Plans and Specifications
CONM 116 Construction Graphics
CONM 117 – Construction Building Information Technology
CONM 121 – Materials Properties & Testing
CONM 122 – Construction Surveying
CONM 211 – Construction Estimating
CONM 212 – Soils and Foundations
CONM 221 – Statics and Structures
CONM 222 – Construction Administration
CONM 311 – Formwork
CONM 312 – Construction Scheduling
CONM 321 – Cost Estimating
CONM 324 – Advanced Construction Computer Techniques
CONM 412 – Construction Contracts
CONM 413 – Construction Economics
CONM 424 – Construction Safety & Management
CONM 499 – Construction Project Management

14. Please indicate which CONM courses need more hands-on experience
CONM 111 – Construction Practices
CONM 112 – Plans and Specifications
CONM 116 Construction Graphics

CONM 117 – Construction Building Information Technology
CONM 121 – Materials Properties & Testing
CONM 122 – Construction Surveying
CONM 211 – Construction Estimating
CONM 212 – Soils and Foundations
CONM 221 – Statics and Structures
CONM 222 – Construction Administration
CONM 311 – Formwork
CONM 312 – Construction Scheduling
CONM 321 – Cost Estimating
CONM 324 – Advanced Construction Computer Techniques
CONM 412 – Construction Contracts
CONM 413 – Construction Economics
CONM 424 – Construction Safety & Management
CONM 499 – Construction Project Management

15. Should there be more hands-on experiences in the program
    Yes. If so, in which classes?
    No

16. Please list any topics you feel are missing/lacking in the program.

Post-Graduation Plans Questions

17. Are you continuing on to graduate school?
    Yes, If yes, what will you be studying
    No

18. Have you accepted a job offer?
    Yes
    No

19. If yes, what is the name of the company?

20. What type of work do they complete? (check all that apply)
    General Contracting
    Construction Management
    Civil – Bridges
    Civil – Roadways
    Civil – Utilities
    Specialty Contractor
    Design-Build
    Testing Agency
    County Road Commission
    MDOT

21. Where is their headquarters located?

22. What is your approximate starting salary?

23. What benefits are included with your job offer?

24. Will you be relocating outside of Michigan?
    Yes. If yes, where?
    No

25. Did you find/meet this company at a Career Fair or evening presentation at the Granger building?
    Career Fair
    Evening Presentation
    Job Posting in the building

26. Did you work for this company in previous summers?
    Yes, how many summers?
    No

27. Do you feel Ferris prepared you well to start your job with this company?
    Yes
    No

Advising Questions

28. Who was your faculty advisor?
    Ferrell Clark
    Bob Eastley
    David Hanna
    John Kantorowski
    Tom Larabel
    Suzanne Miller
    Dan Pratt
    John Schmidt
    Kelly Seitter
    Lee Templin

29. How often did you meet with your faculty advisor for academic, career, or personal matters?
    Once a semester
    Once a month
    As needed

30. My faculty advisor's recommendations were helpful
    Strongly Agree
    Agree

Neither Agree nor Disagree
Disagree
Strongly Disagree

31. How quickly could you arrange a meeting with your faculty advisory or receive an email reply to your question for academic, career, or personal matters?
    Within 1 day
    Within 1 week
    Within 2-3 weeks

32. If you were a transfer student, did you meet with a faculty member before applying to Ferris to help you select the courses you took at your transfer institution?
    Yes
    No

Granger Building Questions

33. Characterize the quality and maintenance of the program's lab equipment

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

34. Characterize the quality and maintenance of the program's lab classrooms

	Practices	Materials	Soils	Computer
Excellent				
Very Good				
Good				
Fair				
Poor				

35. Please rate the physical quality of the program's classrooms
    Excellent
    Very Good
    Good
    Fair
    Poor

Student Involvement Questions

36. Were you a member of the Associated Construction Students (ACS) group?
    Yes. If yes, did you hold a leadership position?
    No

37. Were you a member of Sigma Lambda Chi?
    Yes. If yes, did you hold a leadership position?
    No

38. Did you participate on a student competition team?
    Yes
    No

39. If you did participate on a student competition team, which one?
    ASC – Commercial
    ASC – Design-Build
    ASC – Heavy Civil
    ABC
    Estimating competition

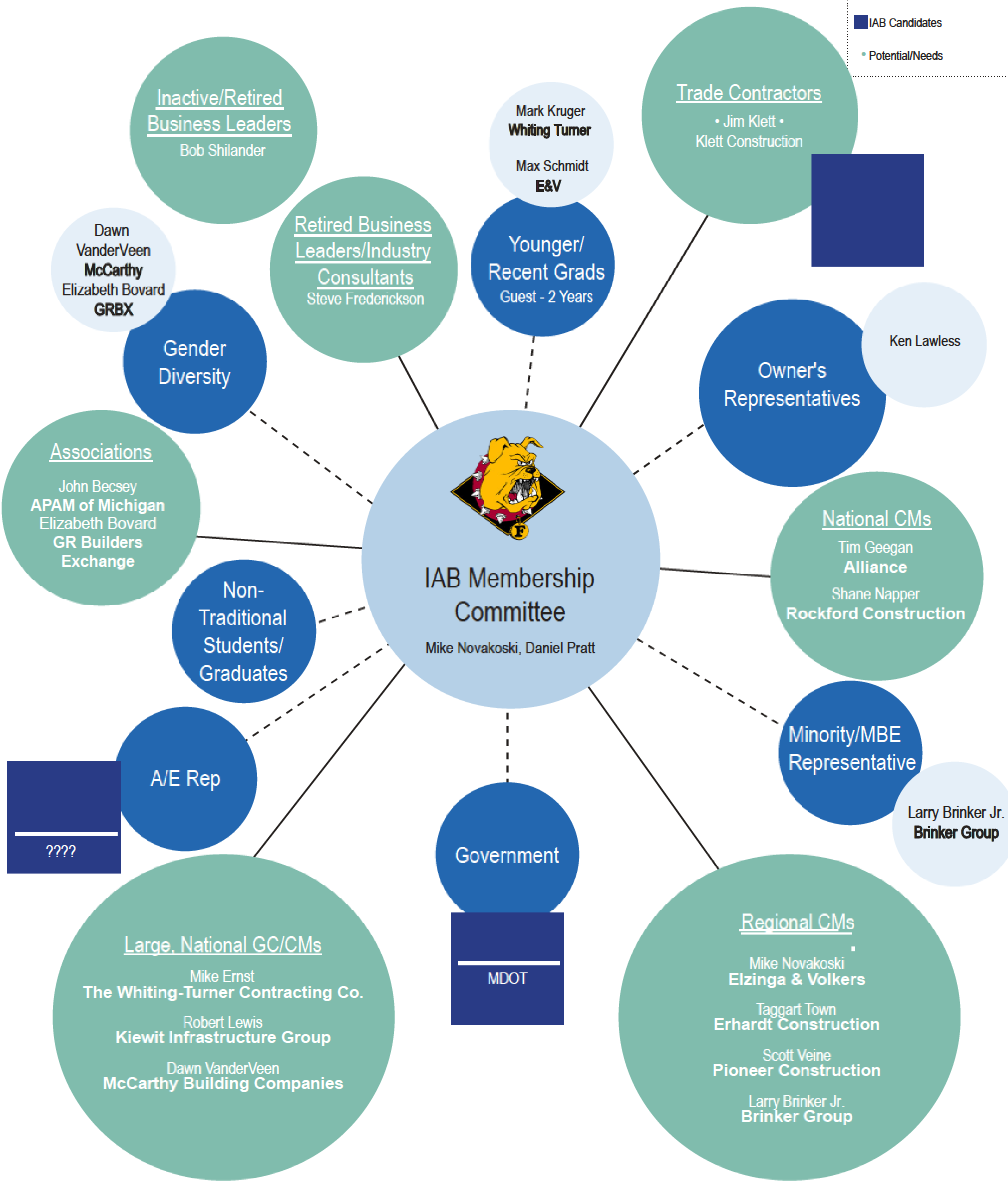
40. Did you work part time during the school year?
    Yes
    No

41. Did you take advantage of Sigma Lambda Chi's free tutoring services in the evening?
    Yes
    No

Ferris State University | IAB Membership Committee

Current and Future Membership Overview Fall 2017

Legend
- Primary Representation
- Secondary Representation
- IAB Candidates
- Potential/Needs



IAB Membership Committee Discussion Items (Fall 2017)

- Updated chart
- Review candidates quali ications summary/background
- Discuss potential new members
- Brainstorm future potential candidates - Chad Comps (AMI) and Andrew Hart (Aldridge Electric)
- Other

Notes:

Ferris State University

Industry Advisory Board Standing Committee Membership 2015 - 2016

<u>EXECUTIVE COMMITTEE</u>

President:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
Vice President:	Steve Frederickson	Past President The Christman Company steve.frederickson@icloud.com 703-740-5654
Program:	Suzanne Miller	605 S. Warren Ave. Big Rapids, MI 49307 SuzanneMiller@ferris.edu 231-591-3024

Ferris State University Industry Advisory Board Committee Members Fall 2017

ACCREDITATION/CURRICULUM COMMITTEE

Chair:	Bob Shilander	Emertus 329 Lakeshore Drive South Holland, MI 49424 bobshilander@charter.net Home: 616-298-7059 or cell: 616-335-0759
Faculty:		
Members:	John Becsey	Asphalt Pavement Association of Michigan 2937 Atrium Drive Suite 202 Okemos, MI 48864 jbecsey@apa-mi.org 517-323-7800 cell: 517-881-4332
	Tim Geegan	Alliance Corporation 728 College Street, Suite A Bowling Green, KY 42101 tgeegan@alliancecorporation.com 270-846-0609 cell: 270-404-0673
	Mike Ernst	Whiting-Turner Contracting Company 300 East Joppa Road Baltimore, MD 21286 michael.ernst@whiting-turner.com 410-821-1100

MEMBERSHIP COMMITTEE

Chair:	Mike Novakowski	Elzinga & Volkers, Inc. 86 East 6th Holland, MI 49423 mikenova@elzinga-volkers.com 616-392-2383
Faculty:	Dan Pratt	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DanielPratt@ferris.edu 231-591-3555
Members:	Larry Brinker, Jr.	BRINKER GROUP 3633 Michigan Avenue Detroit, MI 48216 lbrinkerjr@brinkergroup.com 313-897-9130

Ferris State University Industry Advisory Board Committee Members Fall 2017

DEVELOPMENT COMMITTEE

Chair:	Ken Lawless	Retired, Clark Construction Company Owner's Representative Kglawless44@gmail.com 517-881-1709
Faculty:	Lee Templin	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 Lee_Templin@ferris.edu 231-591-5275
Members:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
	Steve Frederickson	Past President, The Christman Company steve.frederickson@icloud.com 703-740-5654

Ferris State University Industry Advisory Board Committee Members Fall 2017

MENTORING/STUDENT ENHANCEMENT

Chair:	Taggart Town	Erhardt Construction 6060 East Fulton PO Box 208 Ada, MI 49301 ttown@erhardtcc.com 616-676-1222
Faculty:	Dave Hanna	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DavidHanna@ferris.edu 231-591-2680
Members:	Shane Napper	Rockford Construction 601 First Street NW Grand Rapids, MI 49504 snapper@rockfordconstruction.com 616-432-6538
	Scott Veine	Pioneer Construction 550 Kirtland Street, SW Grand Rapids, MI 49507 Scott@pioneerinc.com 616-247-6966
	Dawn Vander Veen	McCarthy Building Companies, Inc. 2859 Paces Ferry Rd., Suite 1400 Atlanta, GA 30339 dvanderveen@mccarthy.com 770-980-8183

IAB Members Unassigned to Subcommittees

Rob Lewis Robert.Lewis@kiewit.com
972-374-4540

Elizabeth Bovard Elizabeth@grbx.com

List of Employers That Hire FSU Graduates On A Regular Basis ($25,000 request):

1. Aldridge Electric
2. Barton Malow
3. Clark Construction Company
4. Elzinga & Volkers
5. Erhardt Construction Company
6. Granger Construction
7. Hensel Phelps
8. Hilton Hotels
9. Hyatt Hotels
10. J Ranck Electric
11. Kent Companies
12. Kiewit/TIC
13. MC Industrial/McCarthy
14. OAK
15. Pepper Construction
16. Pioneer Construction
17. R C Hendricks
18. Reith Riley
19. Rockford
20. Spence Brothers
21. The Christman Company
22. Triangle Associates
23. Turner
24. Walbridge
25. Walsh Construction/Archer Western
26. Whiting Turner
27. Wolverine Building Group

Possible letter to them:

Dear ______,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

We are contacting you with a request to consider a year-end contribution opportunity to support a vitally needed element in our Construction Management program.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low with our selection of texts and many handouts used in the classroom. However, our funding for Supplies & Expenses no longer adequately supports a key education element of the student learning process which will result in high student fees.

As evidenced with your more recent hires, our program provides graduates who are well prepared to start work immediately. A key reason for this attribute is our program's focus on modern laboratory and site experiential technical learning especially in the first two years of study.

We would like to establish an Experiential Technical Learning endowment for our program to ensure its continued ability to provide our current level of educational experience to our students without having to burden them with additional fees. An endowment would allow the program to annually yield 4% of the principal in the fund while sustaining, and hopefully growing, the principal value. To help put the need into perspective, an endowment of $750,000 would provide the program with $30,000 to put toward material and equipment purchases, class content distribution, and student travel (an amount we are currently spending).

Items that this endowment would cover would include:

- Classroom materials, tools, and equipment in our Practices, Materials, Soils, Framing, Mechanical Practices, and Electrical Practices Labs;
- Class field trips to job sites and suppliers;
- Additional classroom handouts and texts that are helpful for use or reference during the class but are not necessary for a student to purchase;
- Software being used in our multiple computer-related courses (estimating, scheduling, 3D modeling/BIM, VDC, highway technology);
- Maintaining and replacing existing computers, iplan tables; ipads/tablets;
- New technology to utilize into the classroom;
- Professional development opportunities for the students (how to interview; business etiquette, etc)

We would ask you to consider making a donation to the Construction Technology & Management Program Endowed Fund titled "Experiential Technical Learning" to allow us to continue to offer such activities to our students. These added resources will provide students with a leading edge in their early career. -A donation of $25,000 or more would significantly help us approach our goal.

Please contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. You may also use a credit card at the following website:
www.ferris.edu/ctmg/endowment

We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

List of Contractors Familiar With Our Program Who May Have Hired Some Of Our Students ($10,000 request):

1. 3 Rivers
2. Ajax Paving Industries
3. Alliance
4. Aristeo
5. AZ Schmina
6. Brinkman
7. CR Meyer
8. CSM Group
9. CASS
10. Closner
11. Commercial Contracting
12. DeMaria
13. Devere
14. E and L Construction
15. Elmer's
16. Fischer
17. Gerace
18. Grand River Construction
19. Gundloch Champion
20. Ideal Steel
21. J R Heineman
22. Kramer Group
23. McCarthy and Smith
24. Miller Davis
25. Moore Trosper
26. Obrien Construction
27. Pearson Construction
28. Plante Moran
29. Pumford Construction
30. Schweitzer
31. Serenus Johnson
32. Siwek
33. Skillman
34. Sorenson Gross
35. Tooles Contracting
36. Wieland
37. Wolgast Construction
38. Woods Construction

Possible letter the send to them:

Dear __________,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

We are contacting you with a request to consider a year-end contribution opportunity to support a vitally needed element in our Construction Management program.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low while providing them impactful educational opportunities.

One of the pillars of our education process at Ferris State University is student competitions that offer real-life applications of program knowledge under time-constrained conditions. We currently participate in 4 major student competitions – all of which require travel out of the state: ABC (4 students) and ASC Region 3 Commercial, Design-Build, and Heavy Civil (6 students each). We have experience excellent success to date in all competitions and many students have procured jobs as a result of their participation in the competitions. We also participate in some in-state estimating competitions. Students have stated, "I learned more in this 3 days that I did all year" which is normally countered with "No, you learned how to apply all that you have learned throughout your years at Ferris in 3 days."

We have an established endowment fund for the purpose of supporting student competitions – the Ken Lawless Student Competition Endowed Fund. Earning from this endowment generate approximately $ ____ at its current funding level. The current total cost for participation in our student competitions is $15,000. We would like to grow this endowment so that it alone can fund the student competitions. An endowment allows the program to pull 4% of the principal in a fund in a year while sustaining the principal value – it lasts in perpetuity.

We would like to request that you please consider making a donation to the Ken Lawless Student Competition Endowed Fund to allow us to continue to offer such activities to our students – giving them a leading edge when looking for jobs and representing Ferris as well as they have in the past. A donation of $10,000 would help us approach our goal efficiently.

Alternately, we are also pursuing an endowment to help us keep student costs lower with classroom materials provided by the program. Both endowments are a great opportunity to lend your support to our program.

Feel free to contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. Otherwise, you can use a credit card at the following website: www.ferris.edu/ctmg/endowment We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

List of Contractors or Suppliers That Have Likely Interacted With FSU Grads or Hired Only 1 Graduate ($5,000):

1. Anlaan
2. AMI
3. Applegate Sheet Metal
4. Bay Masonry
5. Bierlin
6. Bracy and Jahr Masonry
7. C A Hull
8. Conti Electric
9. Cunningham Construction
10. Dan's Excavating
11. Dan Vos Construction Company
12. Davenport Masonry
13. Dee Cramer
14. Fastdecks
15. FZ Electric
16. Hardman Construction
17. John E Green
18. Labelle Electric
19. Leidal and Hart Masonry
20. Mackenzie Excavation
21. Motor City Electric
22. Newkirk Electric
23. Pitsch Demolition
24. Schifer Masonry
25. Vos Glass

Possible letter to send to them:

Dear ______,

2017 has been a positive year for both the construction industry and our Ferris construction management program. Company businesses have improved and our construction program recruiting efforts have paid off yielding a much higher application rate and acceptances.

Although our enrollment has increased, educational funding from the state has decreased. We strive to keep student costs low while providing them impactful educational opportunities.

We are contacting you with a request to consider a year-end contribution opportunity that we hope you will consider to support a vitally needed element in our Construction Management program - a program whose graduates you have encountered in industry and maybe even hired at some point.

We strive to keep student costs low with our selection of texts and many handouts used in the classroom. However, our funding for Supplies & Expenses no longer adequately supports a key education element of the student learning process which will result in high student fees.

Our program provides graduates who are well prepared to start work immediately. A key reason for this attribute is our program's focus on modern laboratory and site experiential technical learning especially in the first two years of study.

We would like to establish an Experiential Technical Learning endowment for our program to ensure its continued ability to provide our current level of educational experience to our students without having to burden them with additional fees. An endowment would allow the program to annually yield 4% of the principal in the fund while sustaining, and hopefully growing, the principal value. To help put the need into perspective, an endowment of $750,000 would provide the program with $30,000 to put toward material and equipment purchases, class content distribution, and student travel (an amount we are currently spending).

Items that this endowment would cover would include:

- Classroom materials, tools, and equipment in our Practices, Materials, Soils, Framing, Mechanical Practices, and Electrical Practices Labs;
- Class field trips to job sites and suppliers;
- Additional classroom handouts and texts that are helpful for use or reference during the class but are not necessary for a student to purchase;
- Software being used in our multiple computer-related courses (estimating, scheduling, 3D modeling/BIM, VDC, highway technology);
- Maintaining and replacing existing computers, iplan tables; ipads/tablets;
- New technology to utilize into the classroom;
- Professional development opportunities for the students (how to interview; business etiquette, etc)

We would ask you to consider making a donation to the Construction Technology & Management Program Endowed Fund titled "Experiential Technical Learning" to allow us to continue to offer such activities to our students. These added resources will provide students with a leading edge in their early career. -A donation of $25,000 or more would significantly help us approach our goal.

Please contact Suzanne Miller (231-591-3024) or Lee Templin (231-591-____) or Ken Lawless (______) with any questions. We are including a prepaid envelope and response card if you wish to help support our program. You may also use a credit card at the following website: www.ferris.edu/ctmg/endowment

We will send you a receipt for tax purposes.

On behalf of the Construction Technology & Management Program, thank you very much for your support.

Ferris State University

College of Engineering Technology

Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna, John Kantorowski

Course: BCTM 234 Electrical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for electrical service and distribution, fire protection, building security and signaling, and building automation systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of electrical trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117;

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Time allocations may vary based upon the Ferris State University Academic Calendar for the term.

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues	1

Ferris State University

College of Engineering Technology

Course Outline

No.	Topic	CLO(s)
	C. Code requirements D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

Ferris State University

College of Engineering Technology

Course Outline

Last Revision Date:	May 2016
Program Coordinator:	Suzanne Miller
Drafted By:	David Hanna

Course: BCTM 235 Mechanical Construction Practices

Credits: 3 Hours

Contacts: 2 Lecture Hours, 2 Laboratory Hours

Course Description: Construction documents for plumbing, piping, fire suppression and mechanical systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of mechanical and piping trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

Course Prerequisites: CONM 111,112, 117; C- or higher in MATH 120/126 or math ACT 26+/SAT 610+

Required Textbooks: American Technical Publishers (2013). *Mechanical and Electrical Systems for Construction Managers*, 3rd Edition.

Required Materials: Calculator with exponential functions

Engineering and architectural scales

Plans and Specifications for the Program's designated project (which are updated periodically)

Course Learning Outcomes

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

Instructional Unit Topic Descriptions and Time Allocations

No.	Unit Topic Description Summary	CLO(s)	Lecture Hours	Lab Hours
1.	Introduction and Orientation		1	
2.	Construction Drawings	1	6	
3.	Construction Specifications	1	4	
4.	Major Materials, Equipment and Appurtenances	3	5	
5.	System Knowledge and Basic Estimating Procedures	2	5	
6.	Construction Installation	4	0	12
7.	Jobsite Management Issues	4	6	
8.	Construction Techniques	5	0	18
9.	Evaluations		3	
	Total Hours		30	30

Topics for Each Instructional Unit

Upon Completion of each instructional unit, the learner will be able to satisfactorily:

No.	Topic	CLO(s)
1.	Introduction and Orientation A. Course goals, policies and procedures B. Course requirements and assessment methods C. Relevance of the course material within the construction industry	
2.	Construction Drawings A. Organization of MEP drawings B. Graphic symbols C. Prepare system isometric drawings D. Prepare system quantity takeoffs	1
3.	Construction Specifications A. CSI system of drawing organization B. Quality and cost issues C. Code requirements	1

Ferris State University

College of Engineering Technology

Course Outline

No.	Topic	CLO(s)
	D. Testing and acceptance techniques E. System and equipment quality information	
4	Major Materials, Systems and Appurtenances A. Major system components and materials B. Major equipment and appurtenances	3
5	System Knowledge and Basic Estimating Procedures A. Major systems and functions B. Basic system design approach C. Basic materials of construction D. Basic sizing and selection criteria	2
6	Construction Installation A. Licensing and permit requirements B. Layout and interference issues C. Methods of construction D. Testing methods E. Acceptance criteria F. Payment procedures	4
7	Jobsite Management Issues A. Coordination of MEP work B. Management of multiple subcontractors C. Scheduling issues with MEP work	4
8	Construction Techniques A. Practice system and component assembly and installation techniques	5
9	Evaluations	
10	Final Examination – Comprehensive Exam	

Meeting Minutes
April 27, 2018
GRN 105, Granger Building, Big Rapids, MI

Attendees:

John Becsey, (APAM)
Steve Frederickson (The Christman Company)
Jim Klett (Klett Construction Company, Inc.)
Mark Krueger (Whiting Turner)
Ken Lawless (Owner's Representative)
Robert Lewis (Kiewit)
Shane Napper (Rockford Construction)
Mike Novakoski (Elzinga & Volkers)
Max Schmidt (Elzinga & Volkers)
Robert Shilander (retired)
Taggart Town (Erhardt Construction)

Faculty & Staff

Brian Bejcek
Ferrell Clark
Mark Dyke
Robert Eastley (Director of the School of Built Environment)
David Hanna
Tom Larabel (Director of ICET – Institute of Construction Education and Training)
Jennifer Miller
Suzanne Miller
Dan Pratt
Kelly Seitter
Lee Templin
Shari Wessels

Guests: Chris Abieg – Instructor at Newaygo Career Tech Center
Dean Larry Schult

Items in italics are action items.

1. Introductions

- All IAB members introduced themselves.
- Brian Bejcek was introduced as our new faculty member
- Max Schmidt was introduced as our new IAB member – recent graduate

1.a Primary Meeting Objectives

Update on Program since last meeting
Dashboard presentation
Mechanical and Electrical Systems Practices class content review
Responses from Senior Survey
New member vote

1.b. IAB Meeting Preparation Documents

IAB Meeting Preparation Documents were emailed out to all IAB members and faculty on April 24, 2018. They included the agenda, a summary of items that were addressed from the previous meeting minutes and some items to be discussed (attached to these meeting minutes, the previous meeting's minutes, the program dashboard, the IAB Subcommittee

Membership roster, an Advisory Board and Industry Survey to be completed at the meeting, New Member Application, and the previous meeting minutes.

2. Approved Previous Meeting Minutes (October 26, 2017)

3. What Is Happening In the Program

Student Roundtables – the kickoff of student round tables with IAB members was today. Being the last day of classes, it was not well attended by students. In the future, it will be held at the Fall meeting which occurs on Thursdays in the middle of the semester.

Industry Speaks - Last week we held a unique event we titled "Industry Speaks". Funded by Whiting Tuner, it brought in 7 guest speakers from around the country considered experts (or "rockstars") in their fields for 4 simultaneous sessions run 4 times so that students had the opportunity to attend all 4. Each lasted 1 hour 15 minutes.

The topics covered included: Conceptual Estimating, Quality Control, LEAN – Pull Scheduling, Virtual Technology in the industry. These were selected based on comments from previous student sessions with the IAB. Students were also fed breakfast and lunch.

It was initially offered to juniors and seniors to give them priority and then opened up to the sophomores and freshmen. An excused absence form will be procured for students attending such events. *During our discussion, it was decided that freshmen and sophomores should always be included in these types of opportunities*

Sessions were filled and feedback from students was extremely positive.

This could be an opportunity in the future to feature experts from different construction companies. We would likely hold it in November when travel is still decent.

Dean's Office – Ferris offered early retirement buyouts to Administration and Staff to reduce spending. 2 secretaries will be leaving the Dean's office. The Associate Dean will be retiring in December. The Dean was refused an early buyout, but he is retiring June 29th.

The Provost will be selecting an Interim Dean from nominations. That person will be in that position 1-2 years for stability while the College determines how we want our structure to be. The Interim Dean can apply to become the permanent Dean.

It was decided that it could a benefit to the program to have a few IAB members take the new Interim Dean (once announced) to dinner to stress the significance of our program to the Industry, providing well-paying jobs upon graduation.

Enrollment – we anticipate similar incoming numbers of students in the fall to be consistent with this past year based on the number of applicants and accepted students.

Curriculum – Our new classes begin next year – Mechanical Systems Practices, Electrical Systems, Practices, and Virtual Design and Construction. Field Engineering becomes a required course for all students.

David Hanna passed out the outline of CONM 373 Ethics and Professionalism in Construction for IAB members to offer some case studies to use in the classroom.

Grand Rapids Cohort – Our new cohort begins in the fall. It is on a 3 year cycle with 2 classes being offered in fall, spring, and summer. The students there are treated like our Architectural Technology transfers from Ferris's Architecture program, meeting the same requirements for consistency between the campuses.

Faculty – Brian Bejcek is our new faculty member. He has a Bachelor of Science in Mechanical Engineering and a Master's of Science in Electrical Engineering. He is teaching our two new mechanical and electrical systems classes as well as Construction Economics.

As indicated in the meeting preparation documents, we have a new hire beginning in the fall.

HLC Teaching Credentials – We have discussed the required credentials for new hires to our program to meet the requirements of the accrediting body for the entire University. We finally received some clarification from the Provost's office and have completed a review of all of our courses to determine what is required to teach the course if an individual does not have the correct degree, but does have industry work experience.

4. Program Dashboard

Enrollment numbers indicate that transfers – both internal and external – have become approximately 50% of our program's enrollment. Our numbers of female students and minority students are fairly consistent over the last 4 years. 50% of our students are considered transfers –this means they transferred anywhere from 12 credits of general education courses to an Associate's degree. We are working to become more diligent about making sure students apply for their Associate's degree when they have completed the courses so that our success rate is accurate. Dan Pratt indicated that some students have stated they do not want to leave their status as pursuing an Associate's degree because it will reduce their funding. This is contrary to the situations we regularly encounter with students and Financial Aid.

Budget – The Dean reduced the budget of 3 of the 4 schools, and subsequently our budget was reduced by $3,900. Over the past 2 years, our budget has been reduced 16% while our enrollment has increased 8%. The drop is even more dramatic when viewed against the budget from 2011-2012 – a drop closer to 42%. Adding Teaching Assistants or Graders does not solve the budget issue as the budget is only Supplies & Expenses after the cost of faculty. *We will add a line to the dashboard indicating the overall budget reduction since we began tracking in 2011-2012. David Hanna will pursue budget data from other schools that are accredited by ACCE to provide a comparison to present to the Interim Dean once they are appointed.*

The IAB stated they would help us with the Interim Dean in any way they can to get our budget more in line with our program's size. Shane Napper requested that we get our message to a new Interim Dean with 3-4 main points including budget compared to other schools, budget vs starting salary.

Recruitment Our program recruitment has remained fairly consistent. We visited the Michigan Construction Teachers Association meeting in February and spoke to them about the Michigan Construction Foundation and our Civil Engineering Technology Associate's degree.

Visits/tours to Granger for the program are also consistent – some alternate their visits by year and a new school district visited this spring. We typically have 1 new school visit each year.

We complete a lot of pre-advising with potential transfer students. This is a strong factor in determining whether they come to Ferris after community college.

Videos of students will get up on the website this summer.

5. **Dean Larry Schult**

Larry explained the University budget cuts. Budgets cuts started a few years ago. The goal is stabilization. Michigan's population has been decreasing and it is now hitting at the college level. It has forced Ferris to recruit from other states. The projection over the next 5 years is to cut $5 million from the budget each year for the next 5 years. The hope is that in 2 years, enrollment will stabilize or increase.

Academic Affairs bears the brunt of the cuts - $2.8 million/year. Our College's share of that hit is $352,000. Extended & International Operations and the College of Arts & Sciences have actually taken the biggest hits to date. He does not know what percentage of enrollment dollars go toward teaching or Ferris's overhead.

2 items are impacting the budget cuts. One, it is a contract year for faculty. Two, the University offered an Early Retirement Buyout to staff. Faculty were not included (as the union rejected the offer since it did not match the contract language).

The College's 2018 – 2019 budget cuts are being handled through attrition and the Early Retirement Buyouts.

Shari was approved for the Early Retirement Buyout, but once she found out that they were not going to replace her position, she indicated that her loyalty to the program was too great to leave under those circumstances.

6. **Student Awards and Scholarships Lunch**

7. Mechanical and Electrical Systems Practices courses

Brian passed out a document indicating some of his thoughts on lab activities as related to the course outcomes and a list of needed materials. The IAB indicted that the course should focus primarily on print reading, estimating, and testing/commissioning, with the lab activities helping students to understand the systems by interacting with mechanical and electrical materials, not necessarily the actual tasks that are completed by the trades.

We are open to any donations from the back page list of needed materials. ASAM (American Subcontractors Association of Michigan) was suggested as a strong source for helping to fund the lab. Feyen & Zylstra and Van Heran Electric, Inc. in Grand Rapids have also indicated an interest in helping. David Feutz is adjuncting for the HVACR program right now and he works for Andy Egan, so he may be approached as well.

Any lab fees to be charged to students must be approved by the Board of Trustees in February so we would be unable to implement any types of fees for at least a year.

We have been speaking with the HVACR faculty regarding the possible use of some of their lab spaces in conjunction with ours and they appear open to the option.

We are starting in fall with just the Mechanical class and will hold both the Mechanical and Electrical classes in the spring (and from now on).

8. ICET – Tom Larabel

ICET's enrollment is down 25% this year. Tom attributes it to the differing 3, 4, and 5 year cycles for the different certifications and the fact that industry ramped up its employees in anticipation of the increase in available road and bridge funding with the new state tax. However, upon receipt of increased funding by the county road commissions, instead of spending on roads and bridges, they focused on equipment, facilities, and their employees.

In February MDOT issued an RFP for Aggregate Training to last 5 years. ICET was the only respondent. However, MDOT has not moved on it. ICET is proceeding as though they are conducting the training in 2019. ICET is waiting for MDOT to issue an RFP for Hot Mix Asphalt Training at any time.

9. Recent Graduate Feedback

Mark Krueger and Max Schmidt were asked to share recommendations for class enhancements or additions, having been in the industry 2 and 1 years, respectively.

Max would like:

- A focus on safety plans, not just overall project safety plans, but also daily safety plans, and to complete an actual activity hazard analysis, assessing risk
- Greater understanding of work scopes
- Increased exposure to Mechanical and Electrical (which he acknowledged the 2 new courses appear to address) and specifically low voltage
- A continued push for students to participate in the student competitions – they really prepared him for the industry.

- Emphasize the importance of technology and the value of those classes to the students – he stated he is not a trades expert, but the value he brings to the trades is his knowledge of technology
- He also emphasized the value of competitions (as did Mark Krueger)
- Visualization in 3D with Revit, SketchUp, and AUtoCAD are still very important

Mark indicated:

- The "scariness" of the competitions should be brought into CONM 499 capstone (or another course) because there is value in experiencing the pressure of the competition
- Greater understanding of work scopes is required prior to graduation
- Estimating has been a key to his success so far and Excel knowledge is very important
- Visualization skills (Revit and SketchUp) have been critical to his success with the Owner
- Submittals – need more emphasis on trying to mimic the process in class and more opportunity to pull information out of the plans and specifications
- A better understanding of the specialty trades – supply vs. install

Ultimately, Max and Mark's top 2 priorities were jobsite hazard analysis and communication (email, public speaking, simulation of the real world).

Communication was discussed by all. The need for students to understand when is it appropriate to text, email, call, or meet. Most students would benefit from speaking in front of strangers more. They tend to be comfortable with their classmates, but that does not prepare them for the real world which can be intimidating. Faculty should require proper email submissions – grammar, clear explanations, attachments or required backup. Suzanne indicated that using students as speakers to the school tours definitely increases their comfort with strangers and getting their thoughts in order before they speak.

ENGL 311 Advanced Technical Writing was discussed. It has been called "too similar" to ENGL 211 Technical Writing and it does not quite address business writing. *The Program will be speaking with the English Department to determine whether a new course that is more of a blend of technical and business writing could be created for our students.*

Safety should be woven throughout the program so that it becomes a culture or second-nature to the students. Silica standards are discussed briefly in CONM 424 Construction Safety, but it is not an OSHA 30 Hour class.

10. CONM 424 Revision

Based on student input at the session with the IAB in October, Ferrell has changed up the presentation requirements and they have become much more effective. They complete a site specific safety plan and a jobsite hazard analysis. They also work on case studies in the class.

11. Student Survey

Snippets from the survey were passed around:

- 31 males, 2 females, 1 invalid entry

- 1 veteran
- 16 attended a career tech center, 18 did not
- 15 changed majors to construction
- 21 were transfers
- Delta CC is our most popular transfer school, followed by Lansing CC, then GRCC and Muskegon CC. Others included GVSU, Wayne State, SVSU, LSSU, Aquinas, North Central Michigan, and Alpena CC
- 32 graduate this spring and 2 graduate this fall
- 4 would like more hand-on experiences in computers class and 3 would like that in safety
- Topics they would like covered more in the program include: Estimating, QA/QC, Scheduling/Logic, and writing contracts.
- 5 are planning on graduate school (4 intend to pursue MBAs)
- 25 of 28 looking for jobs had accepted jobs
- Employers include: Erhardt, Pioneer, Kiewit, BSA, Walbridge Aldinger, Turner, Clark (2), Pepper (2), McCarthy, Triangle (2), Walsh, Pearson Construction, Power Design, Inc; Elzinga-Volkers, Whiting Turner, Granger (2), Allen Edwin Homes, Barton Malow, Baker Concrete, CL Trucking & Excavation, West Wind Construction, Lombardo Homes, General Motors
- Average starting salary: $55,592. Range: $35,000 – $70,000
- 7 are relocating outside of Michigan, 24 are remaining in Michigan
- 13 graduates met their future full-time employers at the Career Fair, 4 at an evening presentation and 2 through job postings in the building
- 19 worked for their future employer the summer previous
- No respondents indicated that Ferris had not prepared them well to start with their company
- Answers were incomplete regarding ACS and SLC with only 14 and 13 responding accordingly
- 3 indicated they had participated on competition teams
- 3 used Sigma Lambda Chi's free tutoring services
- Students ratings on ACCE's Student Learning Outcomes (Scale 0-10)
  - Create written communication appropriate to the construction discipline - 8
  - Create oral presentations appropriate to the construction discipline – 7.88
  - Create a construction project safety plan – 7.15
  - Create construction project cost estimates – 8.24
  - Create construction project schedules – 8.03
  - Analyze professional decisions based on ethical principles – 8.56
  - Analyze construction documents for planning and management of construction processes – 8.29
  - Analyze methods, materials, and equipment used to construct projects – 7.71
  - Apply construction management skills as a member of a multidisciplinary team – 8.44
  - Apply electronic-based technology to manage the construction process – 8.82
  - Apply basic surveying techniques for construction layout and control – 8.83
  - Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process – 8.56
  - Understand construction risk management – 7.88
  - Understand construction accounting and cost control – 6.94
  - Understand construction quality assurance and control – 7.59
  - Understand construction project control processes – 7.29

- Understand the legal implications of contract, common, and regulatory law to manage a construction project – 8.09
- Understand the basic principles of sustainable construction – 7.88
- Understand the basic principles of structural behavior – 8.44
- Understand the basic principles of mechanical, electrical, and piping systems – 7.88

Overall, students believe they are learning the SLOs for the accrediting body. However, Accounting is a concern. ACCT 221 Construction Accounting is taught by the College of Business (COB). Max described it as a course that "starts on Chapter 10." The basics of accounting are not covered and they get very deep into the specifics that do not typically impact a graduate on the construction site or in the office. *The Program will investigate whether the course has moved away from the official outline and will also speak with the COB this summer to determine how to improve the course.*

Items that students felt needed even more coverage include Estimating, QA/QC, Scheduling/LEAN Scheduling, and writing contracts. The first 3 are candidates to be electives in the program – (2) 46-- courses are required for graduation and were designed to allow an in-depth focus on specific topics.

12. Campaign

The Program Endowment Campaign is underway, started by Whiting Turner. We are counting on our employers first to help the program. Then we will move on to our alumni. Lee Templin and Ken Lawless have been speaking with some of the contractors on their lists. Ken indicated that the follow-up is where everything will happen. He believes we will see more donations in the $10,000 range, rather than the higher numbers because there are a lot of organizations looking for donations at this time.

We need to push over the next 4-5 months and will send out another letter with an update of the Whiting Turner donation. The letter will come from both the Program and the IAB.

Acknowledgement will come in the form of a permanent display (similar to what we have in the building already for the fundraising that went toward the construction of the Granger Center.

13. New Member Vote

Chad Comps, a Ferris graduate from Architectural Metals, Inc. (AMI) applied and was approved for membership to the IAB.

14. ACCE Accreditation Status

The new required report is very different from the previous. There is a specific focus on assessment and responding to the result of items being assessed ("closing the loop"). The faculty is meeting Monday and Tuesday (May 7th and 8th) to review course outcomes, input data into our assessment tracking system, and make any necessary revisions to the courses or program. We are also planning a faculty retreat at the start of the fall semester to review all course content with all faculty since almost 40% of our faculty will be new. It also allows us to look for any gaps or overlaps.

15. Subcommittees:

Accreditation/Curriculum Subcommittee –

- See previous

IAB Membership Subcommittee-

- Dawn Vanderveen has left McCarthy for DPW (another large contractor in Atlanta). Suzanne will approach her to see if serving on the IAB is still viable.
- Mike Novakoski will pursue Anthony Lombardo from Lombardo Homes. His son, Cosimo, is graduating from the Program this semester. This would fulfill our opening in the residential sector.
- With McCarthy no longer represented on the IAB, it was decided that Barton Malow Company would be a good fit since they are national and they represent the east side of the state. That way we have 2 national construction managers – 1 from Baltimore (Whiting Turner) and 1 from Detroit. Max Schuster and Steve Rewer are both graduates of the program and could be approached, as could Doug Maibach. Doug Maibach will likely be approached first.
- The Membership Subcommittee is currently reviewing members that have not attended regularly (at least once a year per the IAB bylaws) or recently and will be moving them to emeritus status.
- The subcommittee is also re-establishing start dates for our current active members to get everyone on a proper term rotation.

Development Subcommittee –

- See previous (Campaign section)

Mentoring/Student Enhancement Subcommittee –

- Requested that the Program continue to approach the IAB for guest speakers
- Finalizing their Mentorship program. They intended to start with SLC, but most of SLC thought it would help the underclassmen more, so they are going to change the focus. The logistics of face-to-face meetings was a concern, so a phone call or Skype was determined to be an adequate means of communication 1-2 times per semester between mentor and mentee. They are considering a facilitated "Mentor Night" to kick the program off.

16. Program Course Needs

We are still seeking a new set of prints and specs that are similar to MITA:

- 20,000 SF +
- Mixture of steel framing and masonry bearing structure
- 2 roof types and shapes
- Multiple stories
- Elevator and staircase
- Partial basement
- Varying topography
- Curtainwall or storefront
- Mixture of finishes inside – flooring and wall surfaces; possible exposed ceiling areas

We received the Holland Energy Park drawings from Bob Shilander. Bob is trying to get permission to use the building information model(s) from the project.

Erhardt Construction is working on a set of drawings and specs that could be used in CONM 499 capstone to allow us to alternate the sets each semester.

Mark Dyke requested building information models that could be used in the classroom. They could be limited to use in a lecture, but also models that could be used freely by the students in labs. We added work scopes from the projects be included as well for use in the classroom.

Work Scopes were a discussion item at the student feedback session in October. Lee Templin clarified that he has students complete a Change Order scope of work in CONM 222 Construction Administration. Dan uses the MITA documents in CONM 412 Construction Contracts so that students can see what is in a contract/work scopes, and determine the implications of the scopes. It is more about evaluation of work scopes, not actually writing them.

ICET is looking to construct a new bituminous lab for ICET's use and CETM 214 Advanced Materials.

17. Program Student Groups

Sigma Lambda Chi

- 8 members
- Received the Gold award for service (1 of 9 out of the 55 international members to receive gold)
- Brian Bejcek has agreed to serve as a co-advisor

Associated Construction Students

- 2 field trips to Chicago as well as around the Grand Rapids area and Little Caesar's home office in Detroit.
- Some community service
- Continue to sell clothing in the fall and spring semesters
- It is difficult to get the freshmen interested in belonging – we aren't sure why

18. Other

The lack of freshmen awardee attendance at the Scholarship and Award Luncheon will be used as a teachable moment with those students.

We need to stress residential options in the program. All construction opportunities should be emphasized.

We did miss this item from the previous minutes. To be discussed at our next meeting in October. *Discussed the creation of a Recent Graduate Committee to develop a 2-year post-graduation survey to determine what graduates believe they need from the program once they have been in industry for 2 years. The student feedback session has only contained feedback about how students currently feel* *about classes and may not reflect what they truly learned in them until they have worked for a while. Steve, Scott, and Shane agreed to work together to create such a survey.*

IAB members filled out the program survey to be included in the ACCE report.

19. Next Meeting Scheduled

Next Meeting is set for Thursday, October 25th to coincide with Michigan Construction Hall of Fame Induction Ceremony.

20. Meeting adjourned at 3:30 pm.

Respectfully submitted,

Suzanne K. Miller
Program Coordinator
Construction Technology and Management Programs

Ferris State University Construction Technology and Management Programs	**2017-2018**	**2016-2017**	**2015-2016**	**2014-2015**	**2013-2014**	**2012-2013**	**2011-2012**	**2010-2011**
Freshman Class Size (Fall semester) CONM 100	42	38	38	35	32	19	21	25
Freshman Class Size (Both Semesters) CONM 116	86	91	65	46	59	49	59	40
Total Students	270	260	249	220	223	220	253	289
AAS - BCTM (Building Construction Technology)	152	126	75	18	15	13		
AAS - CETM (Civil Engineering Technology)	28	24	20	14	9	9		
BS - CONM (Construction Management)	94	108	143					
"Pre-" CONM or BCTM or CETM**	0	12	11	9	6	12		
Enrollment % Change From Prior Year	104%	104%	113%	99%	101%	87%	88%	87%
Number of Female students	15	14	14	11				
Number of Minority students	22	24	29	29	33			
Number of Veteran students		10	7	7				
Number of Degrees Conferred								
CONM	56	48	54	38	42	71	63	69
BCTM (Associates)	37	42	11	33	25	40	38	37
CETM (Associates)	12	12	6	12	13	12	20	20
Certificates	0	0	0	2	0	3	0	3
Number of Faculty (Full-time)	8.75	7.25	7.75	8	10	11	11	11
Number of BCTM courses (not sections) taught Fall and Spring	4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
Number of CETM courses (not sections) taught Fall and Spring	2	2 2	2 2	2 2	2 2	2 2	3 2	3 2
Number of CONM courses (not sections) taught Fall and Spring	24 23	24 23	24 23	24 23	24 23	24 23	23 22	23 22
# of courses per faculty member - Fall and Spring	3.4	4.1	3.9	3.75	3	2.72	2.72	2.72
Program Budget	$41,500.00	$44,400.00	$49,406.00	$49,406.00	$49,406.00	$57,128.00	$67,332.00	$75,130.00
Program Reimbursement (Professional Development, ABC, GR Incentive)	Available after June 30th	$14,872.20						
Program Expenses	Available after June 30th	$74,211.11	$74,906.56	$77,262.27	$64,983.35	$83,426.00	$93,228.00	$95,114.00
Budget Per Student	$153.70	$170.77	$198.42	$224.57	$221.55	$259.67	$266.13	$259.97
Expenses Per Student	Available after June 30th	$285.43	$300.83	$351.19	$291.41	$379.21	$368.49	$329.11
Budget % Change from Prior Year	-6.5%	-10.1%	0.0%	0.0%	-13.5%	-15.2%	-10.4%	
Budget % Change from "High" Budget level	-44.8%	-40.9%	-34.2%	-34.2%	-34.2%	-24.0%		
Student to Faculty Ratio	31.3:1	35.9:1	32.6:1	27.5:1	23:1	23:1	23:1	26:1
Placement % at graduation (within 4 months)***	88% as of early April	95% (100%)	96% (100%)	92% (100%)	95% (100%)	91% (100%)		65%
Average Graduate Salary	$55,592.00	$56,500.00	$55,000	$50,579	$48,237	$48,166		$37,928
New Courses Added	0	0	0	0	1*	1	0	0
Number of Recruitment Trips (college fairs, association meetings, schools)	7	7	10	10	15	5	4	
Number of School Tours to Granger	8	7	6	8	8	9	3	

* CONM 117 revised to 3 credit course

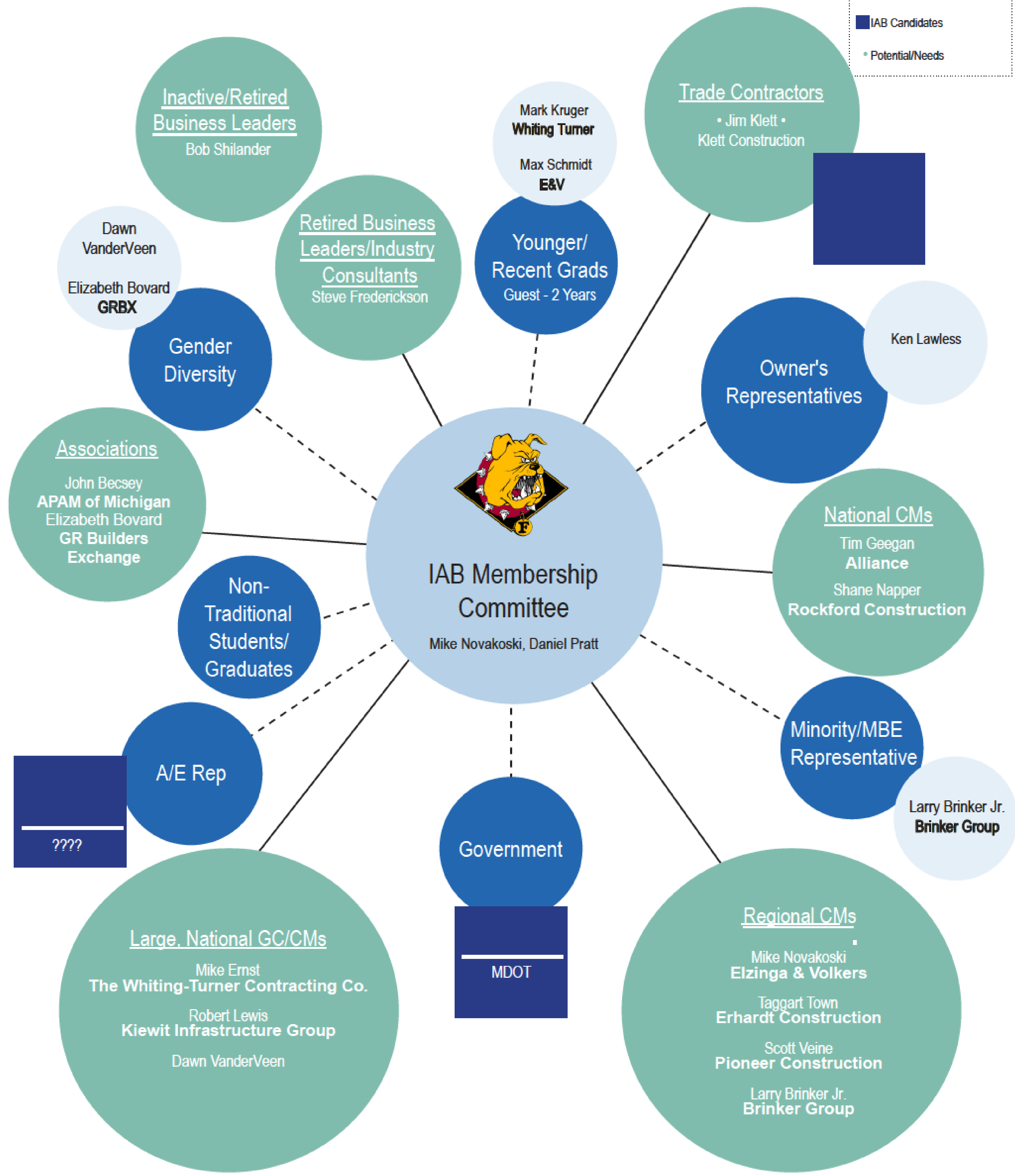
**Designation eliminated - all students must be in a specific program

***If actively seeking employment

Ferris State University | IAB Membership Committee

June 2018

Current and Future Membership Overview Spring 2018



IAB Membership Committee Discussion Items (Spring 2018)

- Updated chart
- Review candidates qualifications summary/background
- Discuss potential new member candidate - Chad Comps (AMI)
- Other

Notes:

FERRIS STATE UNIVERSITY

College of Engineering Technology

Mechanical and Electrical Construction Practices Courses

Starting in the 2018/2019 academic year two new practices courses will be offered – BCTM 234 Electrical Construction Practices, and BCTM 235 Mechanical Construction Practices. Both of these two new courses share the same Course Learning Outcomes which are as follows:

1. Understand and interpret construction documents.
2. Describe basic system(s) theory and operation. (ACCE SLO #20)
3. Identify major materials, equipment and appurtenances.
4. Discuss site issues and construction methods for systems installation and testing.
5. Practice basic construction techniques common to these systems.

These courses have grown out of BCTM 223 Mechanical and Electrical Plans & Specifications, and as such share many of the same outcomes. The most notable difference is the addition of a practices based lab component. The development of these labs is still somewhat of a work in process but the following are some ideas for different lab activities for each course:

- BCTM 234 – Electrical Construction Practices
  - Basic electrical circuits exercises
    - Continuity
    - Voltage
    - Current
    - Impedance (RLC components)
    - Series vs. parallel connections
  - Electrical devices demonstrations
    - Transformer cutaways
    - Motor cutaways
    - Generator example
    - Lock-out/tag-out motor disconnects
  - Wiring exercises
    - Material examples
    - Switch
      - Single pole and three way switches
    - Receptacle
    - Breaker panel

        - Mock-up structure
    - Controls exercises
        - Analog instrumentation
        - Digital instrumentation
        - Input and output logic
        - Control wiring
        - PLC demonstrations
    - Conduit exercises
        - Bending
        - Routing
        - Cable pulls
        - Conduit fill
        - Duct banks
    - Miscellaneous
        - With a given load have students size wire and conduit
        - Joint 234/235 project to install MEP system in a mock-up structure and coordinate between the mechanical and electrical teams
        - Print reading exercises
        - Estimating exercises
        - Testing/commissioning exercise

- BCTM 235
    - Plumbing/piping exercises
        - Material examples
        - Specialty piping examples
            - Medical gas piping
            - Food service
            - Steam
        - Solder copper pipe
        - Assemble steel pipe, threaded and flanged
        - Assemble PVC pipe
        - Assemble cast iron soil pipe, hub and no-hub examples
        - Assemble PEX tubing
        - Plumb a fixture
        - Plumb a mock-up structure
        - Pressure testing
    - HVAC systems exercises (in conjunction with HVAC facilities)
        - Forced air furnace demonstration
        - Hydronic furnace demonstration

2

- A/C demonstration
- Heat pump demonstration
- Duct installation in mock-structure
- Testing and commissioning exercises

o Mechanical devices

- Cut-away valve examples
- Cut-away pump examples
- Cut-away heat exchanger
- Motor and pump alignment exercises
- Mechanical vibration exercises

o Miscellaneous

- With given conditions have students size HVAC systems
- Measuring fan performance changes as duct configurations change
- Piping and duct insulation exercises
- Joint 234/235 project to install MEP system in a mock-up structure and coordinate between the mechanical and electrical teams
- Print reading exercises
- Estimating exercises
- Valve lineup exercise

Lab safety and general mechanical and electrical safety are also important topics that will be included at various points along the lecture and lab components of these courses.

Given the list of new lab activities that are being developed, a significant amount of materials and equipment need to be procured in order to get these labs up and running. A list of items is attached to the end of this document that outlines what is needed. Any donations in either equipment, materials, or financial donations to purchase any of the items would be greatly appreciated.

If you have ideas for specific lab activities, material to include in the course, or are willing to donate to help start the labs up – please contact me. My contact information is listed below. I look forward to developing our students mechanical and electrical systems abilities and knowledge, and I look forward to continue working with the members of the Industry Advisory Board.

Sincerely,

Brian Bejcek, P.E.
Assistant Professor – Construction Technology and Management
brianbejcek@ferris.edu
(231) 591-3063 (office) | (231) 878-3601 (cell)

3

Mechanical and Electrical Construction Practices

BCTM 234 Lab Equipment and Materials
1/0 wire
#3 wire
#26 wire
Romex 14/2
Romex 14/3
Armored cable 12/2
Rigid conduit - 3/4"
Thin wall conduit - 3/4"
Flexible conduit - 3/4"
Resistors (kit)
Inductors (kit)
Capacitors (kit)
Batteries
Breadboard circuit
Transformer cutaway
Generator/motor cutaway
Wirenuts
Bulb sockets
12V switch
3 way switch
2 way switch
Receptacles
Electrical boxes
Breaker panel
Various breakers
Thermocouple
Thermocouple wire
Pressure switch
Solenoid
PLC Trainer
Electrical tape
Misc. plywood
Screws
NEC code book
Cordless drill/driver
Conduit bender
Basic hand tool set
DMM
Drill bits/hole saw sets
Fish tape
Tool/Matl. Storage

BCTM 235 Lab Equipment and Materials
Ball valves
Gate valve - cutaway
Glove valve - cutaway
Butterfly valve - cutaway
Ball valve - cutaway
Check valve - cutaway
Copper pipe - 1/2"
PVC pipe - 2"
Cast iron pipe - 2"
Steel Pipe - 1 1/2" - threaded & flanged
PEX tubing - 3/4"
Misc. specialty piping (medical, etc.)
Misc. steel fittings, threaded & flanged
Misc. copper fittings
Misc. PVC fittings
Hubless DWV fittings
Misc. PEX fittings
Sheet metal duct
Flexible duct
Alignment demo
Vibration analysis demo.
Blower fan assembly
Vanity with lavatory
Misc. 2x6 lumber
Pipe hangers
Duct hangers
Solder
PVC glue
Mechanical code book
Plumbing code book
Piping code books
Tubing cutter
Vice
Set of wrenches
Butane torch
Pipe threader
14" pipe wrench
18" pipe wrench
Sawzall
Chopsaw
PEX expansion gun
PEX crimper and cutter
4' level
Hand pump
Pressure gauge 0-15psi
Manometer

Ferris State University

Construction Technology and Management Industry Advisory Board Agenda

April 27, 2018

8:30 – 8:45 am	Brief Meet and Greet with Industry Advisory Board Members, Faculty, Student Organization Representatives, and interested juniors and seniors– coffee, lemonade, and continental breakfast provided
8:45 – 9:45 pm	Round Table Discussion - IAB Session with Students (20 minutes per topic). Topics include: • First Impressions – how to interact with people early in your career • Ethics – examples of situations students may encounter and how to address • Comparing benefit packages – students are given examples to discuss
9:45 – 10:30 pm	Introductions of IAB members Review and approve previous meeting minutes Update on what is happening within the program Review of dashboard information
10:30 – 10:45 am	Dean Larry Schult Q&A – focus on budget
10:45 – 11:00 am	**Break**
11:00 - 12:00 pm	**Student Awards and Scholarships Presentation**
12:00 – 12:45 pm	**Lunch** Campaign for the Construction Technology & Management Program
12:45 – 1:00pm	**Break**
1:00 – 2:30 pm	ICET Update Presentation of new mechanical and electrical practices courses by Brian Bejcek; Recent Graduate IAB Member Update to the IAB (Mark Krueger and Max Schmidt); New graduate survey results and review
2:30 – 2:45 pm	**Break**
2:45 – 4:00 pm	Update on Campaign for the Construction Technology & Management Program New member nomination and approval – Chad Comps ACCE Preparation – progress report and plans Open IAB and Program Issues and Plans New IAB Items for Future Consideration Standing Committees – report out Completion of ACCE Survey by IAB membership
4:00pm	**Adjourn**

Agenda – Spring 2018

IAB Meeting Preparation

October 26, 2017

GRN 105, Granger Building, Big Rapids, MI

PRE-MEETING PREPARATION STRATEGY

In order to enable more time for dialogue between IAB members and our faculty representatives, we are providing the following summary of important information relative to planned discussion plus documents that should be reviewed prior to the meeting to facilitate an efficient and effective IAB discussion. Please review the attached documents and agenda. We are looking forward to a very effective and enjoyable meeting.

PREVIOUS MEETING MINUTES

The Fall 2017 IAB Meeting Minutes (which were emailed in November) are included separately in this email for you to review prior to approving them at this Spring 2018 meeting.

ACCE ACCREDITATION

We are working on our report that is due June 1, 2018. The faculty are meeting at the end of the semester to review the results of our course outcomes which will become a significant part of the report. IAB input is an important part of the accreditation process. We will be allowing time for IAB members to complete their surveys at the end of the meeting on Friday – the survey will also be attached to this email in the event that you wish to complete it before the meeting.

The Accreditation/Curriculum Subcommittee will be involved with the fall visit to the program. The IAB may also be asked to participate with the Subcommittee. Once we receive further information from ACCE, we will update the IAB.

DASHBOARD

Despite our increased enrollment this year, our S&E (Supply & Expenses) budget was reduced. At the previous meeting, the Dean stated he would be fair with budget reductions across all 4 schools and that he is looking at a new budget model that is more tied to enrollment. This was not implemented and remains an open issue. 3 of the 4 schools within the College experienced budget reductions, despite increased enrollments.

The student-to-faculty ratio is improving with our new hires.

Overall, enrollment has decreased at the University, unlike our College and program. Accordingly the entire University was faced with budget cuts. How to more equitably deal with this University problem without disadvantaging growing programs continues to be an open issue of concern.

STAFFING

Current – We are very pleased with the overall quality of new faculty hires and adjustment to teaching loads continues. Jen Miller is in her 2nds semester teaching. Brian Bejcek started in January. He is teaching Plans and Specifications, Mechanical/Electrical Plans and Specs, and Construction Economics. He will be teaching the new Mechanical Systems Practices course in the fall and the Electrical Systems Practices course in the spring.

Future - We have hired a new faculty member for the Fall 2018 semester. He has adjunct teaching experience in Ohio, a Master's in Management and Organizational Behavior, and acted as an Owner's Representative as well as a General Contractor. He will be teaching Plans and Specifications and both Estimating classes.

ROUNDTABLE DISCUSSION

Juniors and Seniors have been invited to the Roundtable at the beginning of the meeting. 20 minute focused discussion topics suggested by students include:

- **Ethics** (examples of likely situations, how to address them);
- **First Impressions** (how to interact with people in the workplace early in their career – how to approach different personalities);
- **Comparing Benefit Packages** (what to understand, how to determine what is better). Each group will have an IAB "expert" assigned to lead the discussion.

NEW RECENT-GRADUATE MEMBER OF THE IAB

Mark Krueger is completing his tenure as a Recent Graduate Member of the IAB. Max Schmidt will be transitioning to his 2nd year. Brendan Pudduck (who graduated in December) will be our new graduate representative at the Fall meeting.

MEMBERSHIP

The membership rotation should be reviewed by the Membership Subcommittee to determine whose membership term is up for renewal. Please be prepared to report out your findings.

We have discussed Chad Comps from AMI and Andrew Hart from Aldridge Electric as possible candidates. We have an application from Chad Comps attached for your review. We will be voting at the meeting. Andrew Hart from Aldridge Electric, however, has left Aldridge Electric, so another specialty subcontractor should be considered. *Membership Committee should offer ideas and request input from the IAB members* If you have any others, please bring their names and contact information with you to the meeting.

SUBCOMMITTEE MEMBERSHIP

Please see the attachment for the current Subcommittee Memberships

CAMPAIGN FOR THE CONSTRUCTION TECHNOLOGY & MANAGEMENT PROGRAM

As you are aware from an earlier email, our Endowment Fund has been started thanks to the generosity of Whiting-Turner. Now that we have it established, there is no minimum requirement to donate to the endowment. Personalized letters were sent to approximately 60 parties.

COURSE REVIEW

We will be discussing the new Mechanical and Electrical Systems Practices courses with Brian who has been spending the semester getting acclimated to teaching and thinking about these courses. He has been working on ideas for lab activities that will be presented. We may need some contacts in those areas to help us procure some equipment for the labs. If you think of any names/companies/suppliers that you believe may be helpful, please let us know at the meeting.

Responses to Student Session with the IAB at the Fall 2017 Meeting:

- We have received drawings for the Holland Energy Park to use in the classroom. David Hanna is also speaking with Erhardt Construction about another set of drawings so that we can alternate sets each semester.
- CONM 499 had 2 "curveballs" this semester – David Hanna can update the group on those items and is open to suggestions from the IAB
- A new set of drawings for Plans and Specifications was requested, but is difficult to find. We are interested in construction document sets with some of the same qualities as the MITA building in Lansing. If you have a building in mind and can confirm we have permission to re-print the documents for us in the classroom, we would appreciate it.
    - 20,000 SF +
    - Mixture of steel framing and masonry bearing structure
    - 2 roof types and shapes
    - Multiple stories
    - Elevator and staircase
    - Partial basement
    - Varying topography
    - Curtainwall or storefront
    - Mixture of finishes inside – flooring and wall surfaces; possible exposed ceiling areas
- CONM 222 requested a more complicated work scope problem than the dog house. It has been revised to be a Change Order Work Scope. Work Scope is also analyzed in CONM 412 Contracts, although they are not actually written in that class. Lee Templin and Dan Pratt can expand upon this at the meeting.
- Students indicated they wanted to learn more about the sequence of work – means and methods backstory. This will be addressed further in CONM 111 Practices and CONM 121 Materials.
- MS Project is now used in CONM 222 Construction Administration. Lee Templin is bringing Asta to CONM 312 Construction Scheduling to replace Primavera.
- CONM 424 Safety – request for less student presentations. Ferrell Clark to address at the meeting

Meeting Minutes
October 26, 2017
GRN 105, Granger Building, Big Rapids, MI

Attendees:
John Becsey, (APAM);
Elizabeth Bovard (Grand Rapids Builders Exchange);
Mike Ernst (Whiting Turner);
Steve Frederickson (The Christman Company);
Jim Klett (Klett Construction Company, Inc.);
Mark Krueger (Whiting Turner);
Ken Lawless (Owner's Representative);
Shane Napper (Rockford Construction)
Max Schmidt (Elzinga & Volkers)
Robert Shilander (retired);
Taggart Town (Erhardt Construction);
Dawn Vanderveen (McCarthy)
Scott Veine (Pioneer Construction)

Faculty & Staff
Ferrell Clark
Mark Dyke
Robert Eastley (Director of the School of Built Environment)
David Hanna
Tom Larabel
Jennifer Miller
Suzanne Miller
Dan Pratt
Kelly Seitter
Lee Templin
Shari Wessels

Guests: Dean Larry Schult (in the afternoon)

Items in italics are action items.

1. Introductions

- All IAB members introduced themselves.
- Jennifer Miller was introduced as our new faculty member
- Elizabeth Bovard was introduced as our new IAB member
- Max Schmidt was introduced as our new IAB member – recent graduate

1.a Primary Meeting Objectives

Update on Program since last meeting
Dashboard presentation
Campaign

1.b. IAB Meeting Preparation Documents

IAB Meeting Preparation Documents were emailed out to all IAB members and faculty on October 20. 2017. They included the agenda, a descriptive document of items to be discussed, dashboard, a suggested senior student survey, the membership committee diagram, the IAB Subcommittee Membership roster, the proposed endowment campaign documents and companies we intend to pursue for donations, the outlines for our new mechanical and electrical practices – BCTM 234 and BCTM 235, and the previous meeting minutes..

2. Approved previous meeting minutes (April 28, 2017)

3. Student Feedback Session

50% of the attendees indicated they are interested in being superintendents.

- A new project was requested for CONM 499 – perhaps rotate projects semester by semester
- CONM 499 – throw the students a curveball – push them more – perhaps a change to the schedule
- CONM 112 – new plans and spec requested – did not indicate why
- CONM 212 needs to explain why what they are doing in class is significant – they do not see the value
- CONM 222 requested a more complicated work scope problem
- Wish to learn more about the sequence of work – means and methods backstory
- Requested using MS Project in scheduling class instead of Primavera P6. (Lee explained that MS Project is limited in its capabilities compared to P6)
- Requested that more time be spent on Division 0 items – bonding, payments, etc.
- Requested a list of suggested cultural and social awareness general education courses recommended by our faculty
- CONM 424 should not have 4-5 weeks of presentations – shorten them up. They want to understand more jobsite safety. They like developing the safety plan.
- Want a better understanding of the procurement of materials, management of submittals, and strategies. How to create a submittal log, how to determine the timing required for specific submittal items.
- A preconstruction class could be a good 2-credit 400 level CONM course. We could try it out as an experimental course earlier, although it would not count toward the degree.

4. ACCE accreditation

- Bob Eastley will be attending the February ACCE meeting as our program's representative
- Our accreditation visit will be Fall 2018 so we will be spending the Spring 2018 semester preparing for that.
- We will check to see whether having the certificates is valuable to accreditation
- Bob Shilander indicated that ACCE likes student surveys

5. Program Dashboard

- Increased enrollment numbers are indicated.
- The budget and amount spent per student is also shown. Even with increased enrollment, our budget has remained stagnant
- Grand Rapids will begin a new cohort in Fall 2018 – it will take 3 years to complete
- Student:faculty ratio continues to look worse as enrollment increases.

6. **Program Staffing**

We do have a new hire beginning in January 2018 and have submitted our request for a replacement for John Schmidt's position.

7. **Certificates**

We agreed to rename the 2 program certificates and revise their content or prerquisites. The first certificate will be "Construction Operations". It will consist of CONM 211 Estimating I, CONM 222 Construction Administration, CONM 312 Scheduling, and CONM 321 Estimating II. The prerequisites will continue to be MATH 120, CONM 111 Practices, and CONM 112 Plans and Specifications.
The second certificate will be "Advanced Construction Operations" and will consist of CONM 324 Advanced Computer Techniques, CONM 412 Contracts, and CONM 424 Safety & Management.

8. Student Involvement

At our next meeting we would hold a roundtable session with students and IAB members similar to what HVACR does with their IAB. Students would submit questions before the meeting and then they would rotate to different IAB member tables.

9. A New, Temporary IAB Subcommittee

Discussed the creation of a Recent Graduate Committee to develop a 2-year post-graduation survey to determine what graduates believe they need from the program once they have been in industry for 2 years. The student feedback session has only contained feedback about how students currently feel about classes and may not reflect what they truly learned in them until they have worked for a while.
Steve, Scott, and Shane agreed to work together to create such a survey.

10. Previous Student Feedback Request Regarding Soft Skills

Discussed the use of the IAB to continue to help students with soft skills
Lee indicated that the English department has offered to create a unique ENGL 321 section just for our students that would focus on technical writing, email etiquette, and communication skills. *The program will pursue with the English department.*

11. Proposed Student Survey

After much discussion, it was determined that the advising and program questions are not needed. The remaining questions help us to understand our students and will help with ACCE accreditation, per Bob Shilander. *Question 10 will be revised to ask whether a student has a minor or other Associate's or Bachelor degree*.
The questions will be joined with the survey questions Dave issues to his CONM 499 class. *A new version will be emailed to the IAB and faculty.*

12. Course Review

- Dave requested that IAB members give him some case studies to use in our new ethics and professionalism class
- It was suggested that the following be added to the Course Learning Outcomes for both BCTM 234 and 235:
    - Understand material components and acquisition times

  - Understand schedule implications of a contractor not continuously on site and their necessary "work-arounds"
  - Logistics, pre-assembly, and 2nd shift/off-shift practices (how equipment gets to the site, what to do if equipment shows up early on the site)
- Commissioning should be added to both courses
- There should be a focus on the practices of successful contractors
- There should be a focus on the front ends/planning/work scopes
- Review what owner may/may not provide o typical projects
- Both classes should tie to the VDC class
- Include low voltage in the course description for CONM 234

13. Campaign

It was determined that we need to pursue an endowment campaign. The list of contractors was reviewed and HDR Engineering, Black and Veatch, Erickson Crane, and The Accident Fund will be added to the list. AMI and Vos Glass are related.

More donation tiers were suggested

Naming opportunities should be mentioned

The letter will be revised – Ken, Lee, and Suzanne will work on it and include it with these meeting minutes. It is our intention to get it out before the end of the year so that companies that may be looking to use some of their cash have the opportunity to do so.

14. Dean Larry Schult

Overall University enrollment is down. Budgets have been decreased for all colleges*. Larry indicated that he will be fair with budget reductions across all 4 schools and that he is looking at a new budget model to tie it to enrollment.*

We are preparing for our University accreditation visit from HLC in 2020. There will be a focus on instructors having the proper credentials for the classes they teach. There is no established plan at this time if an instructor does not meet the teaching requirements.

15. Recent Graduate Feedback – Mark Krueger and Max Schmidt

- The visualization course was very helpful
- SketchUp (taught in the program) is a program they use often in industry
- Estimating classes are very helpful – you get out of it what you put into it
- Need a greater emphasis on work scopes
- Scheduling class was very helpful
- Learned most of their people skills and work environment skills with their extra-curricular activities such as SCAN, ACS, competitions, bid simulations
- Mark's boss indicated that as an employee, Mark has a practical knowledge that has paced him a few steps ahead of other school graduates which allows him to learn the company nuances
- They would like to learn more about bid analysis, work scopes, MEP, and how to deal with changes

16. ICET

ICET had a good last year and enrollment so far this year appears to be similar to last year.
MDOT has put out a request for proposal for an Aggregate Training Manager and a Hot Mix Training Manager – Aggregate is due in December while Hot Mix is due in February. Tom is preparing to respond to both. Part of the response will require that we acknowledge our facilities and their need for improvement.
We need a new bituminous lab on the ICET campus – which we also use for some CETM 214 labs. This will be a separate campaign from the endowment campaign. For that reason, the endowment campaign will not include paving contractors
The new lab would take the current hot mix asphalt equipment from the Klett lab in the Granger building and move it to the new lab. This would open up the soils lab to be used for Mechanical and Electrical practices more easily

17. Subcommittees:

IAB Membership

- Brendan Pudduck will be our new recent graduate next year when Mark Krueger rotates off the IAB.
- It appears that Kim Ridings and Tim Geegan have been unable to attend meetings should be moved to emeritus status.
- *Ken Lawless will approach Chad Comps from AMI regarding possible membership*
- *Suzanne will approach Andrew Hart from Aldridge Electric regarding possible membership*

Development Committee –

- Ken Lawless has assumed the Chair position of this committee. It now consists of Ken, Lee, and Suzanne
- See previous discussion regarding the endowment campaign

Mentoring/Student Enhancement Committee –

- The committee has developed a guideline for a CONM Program Mentoring Network that the Committee intends to implement starting with Sigma Lambda Chi Members. Ultimately they would like to expand it to the junior year students. See attachment included with theses meeting minutes. *We need to determine whether the Ferris name can be used in conjunction with it.*
- Upcoming topics for our students include: contract issues, sequencing, and staying on schedule
- Elizabeth was recruited to this committee

Accreditation/Curriculum Committee –

- Bob Eastley was added as the faculty representative to this committee
- Will be preparing to help with Transfer Guides and the upcoming ACCE visit

18. Other

The IAB Committee Membership Roster has been revised and is attached to these meeting minutes

19. Next Meeting Scheduled

Next Meeting is set for Friday, April 27th to coincide with the last day of classes and our student awards luncheon. The Construction Management Program Golf Outing will be held Saturday, April 28th at Falcon Head Golf Course in Big Rapids. All are welcome to participate. Please contact Lee Templin for more information.

20. Meeting adjourned at 4:30 pm.

Respectfully submitted,

Suzanne Miller
Program Coordinator
Construction Technology and Management Programs

Ferris State University Construction Technology and Management Programs	2017-2018	2016-2017	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012	2010-2011
Freshman Class Size (Fall semester) CONM 100	42	38	38	35	32	19	21	25
Freshman Class Size (Both Semesters) CONM 116	86	91	65	46	59	49	59	40
Total Students	270	260	249	220	223	220	253	289
AAS - BCTM (Building Construction Technology)	152	126	75	18	15	13		
AAS - CETM (Civil Engineering Technology)	28	24	20	14	9	9		
BS - CONM (Construction Management)	94	108	143					
"Pre-" CONM or BCTM or CETM**	0	12	11	9	6	12		
Enrollment % Change From Prior Year	104%	104%	113%	99%	101%	87%	88%	87%
Number of Female students	15	14	14	11				
Number of Minority students	22	24	29	29	33			
Number of Veteran students		10	7	7				
Number of Degrees Conferred								
CONM	56	48	54	38	42	71	63	69
BCTM (Associates)	37	42	11	33	25	40	38	37
CETM (Associates)	12	12	6	12	13	12	20	20
Certificates	0	0	0	2	0	3	0	3
Number of Faculty (Full-time)	8.75	7.25	7.75	8	10	11	11	11
Number of BCTM courses (not sections) taught Fall and Spring	4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
Number of CETM courses (not sections) taught Fall and Spring	2	2 2	2 2	2 2	2 2	2 2	3 2	3 2
Number of CONM courses (not sections) taught Fall and Spring	24 23	24 23	24 23	24 23	24 23	24 23	23 22	23 22
# of courses per faculty member - Fall and Spring	3.4	4.1	3.9	3.75	3	2.72	2.72	2.72
Program Budget	$41,500.00	$44,400.00	$49,406.00	$49,406.00	$49,406.00	$57,128.00	$67,332.00	$75,130.00
Program Reimbursement (Professional Development, ABC, GR Incentive)	Available after June 30th	$14,872.20						
Program Expenses	Available after June 30th	$74,211.11	$74,906.56	$77,262.27	$64,983.35	$83,426.00	$93,228.00	$95,114.00
Budget Per Student	$153.70	$170.77	$198.42	$224.57	$221.55	$259.67	$266.13	$259.97
Expenses Per Student	Available after June 30th	$285.43	$300.83	$351.19	$291.41	$379.21	$368.49	$329.11
Budget % Change from Prior Year	-6.5%	-10.1%	0.0%	0.0%	-13.5%	-15.2%	-10.4%	
Student to Faculty Ratio	31.3:1	35.9:1	32.6:1	27.5:1	23:1	23:1	23:1	26:1
Placement % at graduation (within 4 months)***	88% as of early April	95% (100%)	96% (100%)	92% (100%)	95% (100%)	91% (100%)		65%
Average Graduate Salary	$55,592.00	$56,500.00	$55,000	$50,579	$48,237	$48,166		$37,928
New Courses Added	0	0	0	0	1*	1	0	0
Number of Recruitment Trips (college fairs, association meetings, schools)	7	7	10	10	15	5	4	
Number of School Tours to Granger	8	7	6	8	8	9	3	

* CONM 117 revised to 3 credit course

**Designation eliminated - all students must be in a specific program

***If actively seeking employment

Ferris State University

Industry Advisory Board Membership and Standing Committee Membership 2017 - 2018

ALL MEMBERS

John Becsey	APAM
Larry Brinker	Brinker Group
Elizabeth Bovard	Grand Rapids Builders Exchange
Mike Ernst	Whiting Turner
Steve Frederickson	Past President, The Christman Company; Innovative World Solutions
Jim Klett	Klett Construction Company, Inc.
Mark Krueger	Whiting Turner (recent graduate)
Ken Lawless	Owner's Representative
Rob Lewis	Kiewit
Mike Novakoski	Elzinga & Volkers
Shane Napper	Rockford Construction
Max Schmidt	Elzinga & Volkers (recent graduate)
Robert Shilander	Retired
Taggart Town	Erhardt Construction
Dawn Vanderveen	McCarthy
Scott Veine	Pioneer Construction

EXECUTIVE COMMITTEE

President:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
Vice President:	Steve Frederickson	Past President - The Christman Company Innovative World Solutions 44050 Ashburn Plaza, Suite 195-656 Ashburn, VA 20147 steve@innovativeworldsolutions.com 703-217-7688
Program:	Suzanne Miller	605 S. Warren Ave. Big Rapids, MI 49307 SuzanneMiller@ferris.edu 231-591-3024

ACCREDITATION/CURRICULUM COMMITTEE

Chair:	Bob Shilander	Emeritus 329 Lakeshore Drive South Holland, MI 49424 bobshilander@charter.net Home: 616-298-7059 or cell: 616-335-0759
Faculty:	Bob Eastley	605 S. Warren Ave. Big Rapids, MI 49307 RobertEastley@ferris.edu 231-591-2369
Members:	John Becsey	Asphalt Pavement Association of Michigan 2937 Atrium Drive, Suite 202 Okemos, MI 48864 jbecsey@apa-mi.org 517-323-7800 cell: 517-881-4332
	Mike Ernst	Whiting-Turner Contracting Company 300 East Joppa Road Baltimore, MD 21286 michael.ernst@whiting-turner.com 410-821-1100

MEMBERSHIP COMMITTEE

Chair:	Mike Novakowski	Elzinga & Volkers, Inc. 86 East 6^{th} Holland, MI 49423 mikenova@elzinga-volkers.com 616-392-2383
Faculty:	Dan Pratt	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DanielPratt@ferris.edu 231-591-3555
Members:	Larry Brinker, Jr.	BRINKER GROUP 3633 Michigan Avenue Detroit, MI 48216 lbrinkerjr@brinkergroup.com 313-897-9130

DEVELOPMENT COMMITTEE

Chair:	Ken Lawless	Retired, Clark Construction Company Owner's Representative Kglawless44@gmail.com 517-881-1709
Faculty:	Lee Templin	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 Lee_Templin@ferris.edu 231-591-5275
Members:	Jim Klett	Klett Construction Company, Inc. 62994 Territorial Road Hartford, MI 49057 jamesklett2@hotmail.com 269-621-4217
	Steve Frederickson	Past President, The Christman Company Innovative World Solutions steve@innovativeworldsolutions.com 703-217-7688

MENTORING/STUDENT ENHANCEMENT

Chair:	Taggart Town	Erhardt Construction 6060 East Fulton PO Box 208 Ada, MI 49301 ttown@erhardtcc.com 616-676-1222
Faculty:	Dave Hanna	Ferris State University 605 S. Warren Ave. Big Rapids, MI 49307 DavidHanna@ferris.edu 231-591-2680
Members:	Shane Napper	Rockford Construction 601 First Street NW Grand Rapids, MI 49504 snapper@rockfordconstruction.com 616-432-6538
	Scott Veine	Pioneer Construction 550 Kirtland Street, SW Grand Rapids, MI 49507 Scott@pioneerinc.com 616-247-6966
	Dawn Vander Veen	McCarthy Building Companies, Inc. 2859 Paces Ferry Rd., Suite 1400 Atlanta, GA 30339 dvanderveen@mccarthy.com 770-980-8183
	Elizabeth Bovard	678 Front Ave. NW, Suite 330 Grand Rapids, MI 49504 Elizabeth@grbx.com 616-949-8650

IAB Members Unassigned to Subcommittees

	Rob Lewis	Robert.Lewis@kiewit.com 972-374-4540

Ferris State University
Advisory Board and Employer Survey

Name: ____ ☐ IAB Member

Company: ____

Job Description:
_______ Owner
_______ Senior Company Executive
_______ Project Manager
_______ Estimator
_______ Superintendent
_______ Project/Field Engineer
_______ Other (explain): ____________________________

Survey Objective. This survey is intended to assess how well our program meets the needs of the businesses that hire or may hire our students. Please indicate how well Ferris State University College of Engineering Technology graduates meet your expectations as an employer and/or as a member of the Advisory Board for the named degrees. Our graduates hold one or more of the following degrees: AAS in Building Construction Technology (BCTM) , AAS in Civil Engineering Technology(CETH), and BS in Construction Management (CONM).

The following characteristics focus on your experience/interaction with
Construction Management (4-year degree) graduates.
Note: SLO refers to ACCE Student Learning Outcome and Applicable Course Reference

(Place an "X" under the appropriate response.)

	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Written communication effective and appropriate to the construction discipline (SLO #1)					
Oral communication effective and appropriate to the construction discipline (SLO #2)					
Overall construction safety understanding (SLO #3)					
Ability to create a construction safety plan (SLO #3)					
Overall estimating competency (SLO #4)					
Ability to create a construction project cost estimate (SLO #4)					
Ability to create a construction project schedule (SLO #5)					
Ability to analyze professional decisions based on ethical principles. Workplace ethics applied to construction management decisions (SLO #6)					
Visualization and blueprint reading competency (SLO #7)					
Other contract document interpretation and understanding (SLO #7)					
Understanding of construction methods, materials, and equipment (SLO #8)					
Ability to work within a multi-disciplinary team (SLO #9)					

Ferris State University
Advisory Board and Employer Survey

Computer software competency to manage the construction process – BIM/3D Modeling (SLO #10)					
Computer software competency to manage the estimating process (SLO #10)					
Computer software competency to manage the project schedule (SLO #10)					
Other computer software competency (MS Office, email) (SLO #10)					
Surveying & Layout Competency and application to the project (SLO #11)					
Awareness and understanding of different methods of construction project delivery and the roles/responsibilities of those involved in the design and construction process (SLO #12)					
Recognize risks in the construction process (SLO #13)					
Understand options for mitigating construction risks (SLO #13)					
Understand construction accounting and cost control (SLO #14)					
Construction quality assurance and control competency (SLO #15)					
Understand and apply construction project control processes (SLO #16)					
Understand the legal implications of contract, common, and regulatory law to manage a project (SLO #17)					
Understand and apply the basic principles of sustainable construction (SLO #18)					
Understand and apply the basic principles of structural behavior (SLO #19)					
Understand and apply the basic principles of mechanical, electrical, and piping systems (SLO #20)					
General business understanding applied to managing a construction project					
Overall work preparedness including anticipation of the unforeseen					
Education foundation for potential promotion					

Ferris State University
Advisory Board and Employer Survey

The following characteristics apply only to your experience/interaction with **Civil Engineering Technology (2-year degree)** graduates (This would likely be during a summer internship as most graduate with the Bachelor degree as well)					
	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Material Properties and Testing competence					
Highway Technology understanding and application competence					
Hydraulic Principles understanding and application competence					

The following characteristics apply only to your experience/interaction with **Building Construction Technology (2-year degree)** graduates (This would likely be during a summer internship as most graduate with the Bachelor degree as well)					
	Did not meet Expectations	Marginally Met Expectations	Met Expectations	Exceeded Expectations	Does not Apply
Field Engineering principles understanding and application competence					
Mechanical & Electrical Plans and System understanding and application competence					
Wood & Steel Framing principles understanding and application competence					

The following question applies to **ALL** program graduates.			
	Doubtful *	Likely	Definitely
Given the appropriate economic conditions in the construction industry, I would hire a Ferris State University graduate			
* Please comment:			

Ferris State University
Advisory Board and Employer Survey

Based upon your experience with Ferris State University and possibly other universities with construction management programs, please answer the following:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure / Unable to Answer
The program has an adequate number of faculty with required teaching and construction management experience					
The program's faculty have satisfactory academic credentials and experience					
The program's faculty have adequate Ferris institutional support for professional development and continuing education					
The program has adequate facilities including computer and practice laboratories					
The program receives adequate financial and leadership support from the university					
There is high demand for graduates from Ferris State University's construction program(s)					
The graduates of this program are competitive with graduates of similar programs at other universities					
The American Council for Construction Education (ACCE) accreditation is significant to the success of our hiring program and the Construction Management program					
The program's curriculum meets the needs of our company and the construction industry					
The program's curriculum is updated in a timely manner to accommodate new technologies					

Ferris State University
Advisory Board and Employer Survey

In keeping with the program's desire to remain current with industry needs/trends, the following questions apply to our present thinking regarding course topics we are presently incorporating into our programs over the next year. We have recently (2017-2018 academic year) added classes to the overall curriculum in: Virtual Design and Construction; Mechanical Systems Practices; Electrical Systems Practices; Field Engineering for all graduates (not just the building side); and 400-level electives including (sustainability, power and process plant construction, and civil infrastructure)

We would appreciate your feedback on the following potential courses we are considering adding and their importance to your firm.

	Less Important to My Firm	Generally Support	Very Important to My Firm	Brief Comment
400-level targeted electives on such subjects as: Demolition, Healthcare Construction, Historical Preservation				
An organized program whereby the first two years of the CM program would apply toward a residential builder's license with perhaps an additional course outside of the program to complete the necessary 60 hours of pre-licensure education				

Finally, we would like to offer you the opportunity to comment on any aspect of the Ferris State University CONM, CETH, and BCTM educational programs. Please offer any comment that would be useful to our continuing quest to improve our effectiveness and quality.

Aspects of the FSU program that are particularly valuable to you including curricula content, faculty, and special programs	
Aspects of the FSU program that you believe could be strengthened or added to the program to yield a more effective FSU graduate	
Other comments	

Thank you for the time you have taken to complete this survey. Your viewpoints are very important to the College and our program. Please return the survey in the addressed, stamped envelope included in this mailing.

Ferris State University
Industry Advisory Board Member Application Form

What is an Industry Advisory Board (IAB)? An Industry Advisory Board comprises a group of dedicated industry representatives from a diverse cross section who serve in an advisory role in program-related planning and decision making. Through the IAB, Ferris State University forges an alliance with its construction industry partners to provide a network of support for the program and it's students.

Objectives: The overall objectives of the IAB are:

- Evaluation of achievement of the Construction Technology and Management Program educational objectives.
- Input on programmatic decisions (e.g., software to use in courses) and development of strategic documents (e.g., program mission statement, program educational objectives).
- Support the University's recruiting efforts of students, faculty, and Advisory Board members.
- Provide a mutually beneficial liaison between industry practitioners and FSU faculty.
- Advocate support for the program through their companies and industry contacts resulting in mentorship of students, equipment donations, scholarships, internships, etc.

Time Commitment: The Ferris State Industry Advisory Board typically meets two times a year (May and November) for a full day on the Big Rapids Campus. You are expected to be physically present for at least one meeting per year. In some years, such as around ACCE review years, additional meetings may be held. Committee meetings (i.e. accreditation, development, membership, etc) will be held as needed and each member is asked to take an active role.

Further involvement in FSU program activities is welcomed. Members will serve staggered 3-year terms. Vacancy appointments of members shall be filled for the remained of the unexpired term of the vacancy.

Dues: While there is no personal financial cost associated with the Industry Advisory Board, each member is encouraged to participate in fundraising events and support financially to his/ her ability.

Please also provide a resume.
Please email to the Membership Committee Chair, Mike Novakoski
mikenova@elzinga-volkers.com
Subject Line: FSU Industry Advisory Board Application: (Your Name)

Ferris State University
Industry Advisory Board Member Application Form

Name: _Chad Comps________________________________
Business Name:__Architectural Metals Inc.________________
Address: _8188 South State Road, Portland, MI 48875______
Email:_ccomps@archmetalsinc.com___________________
Business Phone: _616-374-0161_____________________
Cell:__517-719-8~~147~~ 8417_____________________

Educational Background (Higher Education/Advanced Studies, Degrees (and dates) Received :

B.S. in Construction Management from Ferris State University 2000

Questions:

1. Briefly describe why you wish to serve on this advisory committee:

I am very thankful for my education at Ferris, specifically the Construction Management program, I met a lot of great people both students and professors that I am still friends with today. I think Ferris was a great experience for me and I would like to help in anyway I can to make it a great experience for others.

2. Describe your qualifications and/or skills which would benefit this advisory committee?

I was an active part of this program while on campus, I was part of the student competition teams, I worked in the construction lab, I was part of the honors society, and I tutored some foreign exchange students in the program. After graduation I took a non-traditional approach of working for a small sub-contractor instead of a large CM or general contractor, which I think may provide a different perspective on some discussions.

3. Are you currently involved with other Industry Advisory Boards? YES ☐ NO X

4. Have you served on an Industry Advisory Board previously? If so, which Board(s)?

No I have not.

Ferris State University
Industry Advisory Board Member Application Form

Ferris State University
Industry Advisory Board Member Commitment Contract

Please mark all that apply:

__X_I am able to commit time and energy to the Industry Advisory Board.

_X__I am able to attend Industry Advisory Board meetings on Campus (at least once per year).

__X_I am willing to work as an active member of a committee either chosen by me or one to which I am assigned.

Applicants Signature X_______________ Date: 4/2/18

CHAD COMPS

10575 Coats Grove Road
Woodland, MI 48897
(517) 719-8417
chadandkendracomps@gmail.com

SKILLS

*Detail Oriented

*Ability to multitask efficiently

*Effective problem-solving skills

*Attentive listener

EXPERIENCE

Sr. Project Manager/Estimator
Architectural Metals Inc.
May 2000-Present

*Prepare and submit budgets, schedules, and change orders per requests from customers

*Inspect and review projects to monitor compliance with approved shop drawings and specifications.

*Procure materials and supplies per specifications in accordance with project schedule.

*Maintain open communication with customers, suppliers, and subcontractors.

*Oversee, teach and instruct project managers.

EDUCATION

Diploma| May 1996 | Cheboygan Area High School

Bachelors of Science in Construction Management | May 2000 | Ferris State University

VOLUNTEER POSITIONS

Manna's Market

Board of Trustees Secretary at LUMC

Centershot Ministries Instructor at LUMC

Ferris State University – College of Engineering Technology – School of Built Environment – Construction Technology and Management Program

Self-Study for the Re-Accreditation of the Bachelor of Science in Construction Management Degree

Prepared for the American Council for Construction Education

June 2018

Volume I

Table of Contents

ABBREVIATIONS + PROGRAM HIERARCHY

Commonly Used Acronyms

- **ARCH** Couse prefix for courses offered toward the AAS in **A**rchitectural **T**echnology
- **AT** Architectural Technology
- **BCTM** Course prefix for courses offered toward the AAS in **B**uilding **C**onstruction **T**echnology
- **CET** College of Engineering Technology
- **CETM** Course prefix for courses offered toward the AAS in **C**ivil **E**ngineering **T**echnology – Highway Focus
- **CLACS** Center for Leadership, Activities, and Career Services
- **CMBT** Old designation for degree path – 4 year Bachelor degree in Construction Management with a Building Technology focus
- **CMCT** Old designation for degree path – 4 year Bachelor degree in Construction Management with a Civil Technology focus
- **CONM** Course prefix for courses common to all students whether in the AAS or BS degree sequence
- **CTMG** Construction Technology & Management Program
- **FSU** Ferris State University
- **IAB** Industry Advisory Board
- **SAI** Student Assessment of Instruction
- **SBE** School of Built Environment

- **AAS BCTM** Associates in Applied Science in Building Construction Technology Management
- **AAS CETH** - Associates in Applied Science in Civil Engineering Technology Management– Highway Emphasis
- **BS CONM** Bachelor of Science in Construction Management

Hierarchy:

University	Ferris State University	FSU
College	College of Engineering Technology	CET
School	School of Built Environment	SBE
Program	Construction Technology & Management (Educational Unit)	CTMG

Current Degree Paths:

2 years		2 years
AAS BCTM	+	BS CONM
AAS CETH	+	BS CONM
AAS AT	+	BS CONM

Prior Degree Paths

2 years		2 years		4 year
AAS BCTM	+	BS CONM	or	BS CMBT
AAS CETM	+	BS CONM	or	BS CMCT

SECTION I

INTRODUCTION

Submitted by: Ferris State University

Construction Technology and Management Program

Bachelor of Science in Construction Management

1.1 REQUIREMENTS

1.1.1 INSTITUTION AND DEGREE PROGRAM ELIGIBILITY

1.1.1.1 FERRIS STATE UNIVERSITY

Ferris State University is accredited by The Higher Learning Commission of the North Central Association of Colleges and Schools

Ferris was founded in 1884 by Woodbridge and Helen Ferris as the privately-owned Big Rapids Industrial School. It became a state institution in 1950 and a state university in 1987. Since its beginning, Ferris has been dedicated to providing students of diverse backgrounds with educational opportunities for rewarding professional and civic lives.

Ferris State University is a mid-sized four-year public university known for its quality of instruction and large selection of academic programs. These range from associate to doctoral degrees, offered through eight degree-granting colleges: Arts and Sciences, Business, Education and Human Services, Engineering Technology, Health Professions, Kendall College of Art and Design, Michigan College of Optometry, and Pharmacy.

The university strives to align its practices and resources in support of its core values of collaboration, diversity, ethical community, excellence, learning and opportunity. Ferris' mission is to prepare students for successful careers, responsible citizenship and lifelong learning. Through its many partnerships and its career-oriented, broad-based education, Ferris serves our rapidly changing global economy and society.

Ferris equips students to contribute to a changing world by offering a challenging, adaptive curriculum that consists of a unique blend of technical and professional programs based in traditional academic areas and driven by industry demand. Its many and varied program offerings include several degrees that are unique in Michigan or the United States.

Students at Ferris have exceptional access to faculty due to the university’s low student-faculty ratio and small class sizes, which promote more engaging instruction, one-on-one career advice, and professional connections. Courses at Ferris State are taught by credentialed, dedicated instructors who have real-world experience in their fields and provide relevant, adaptive coursework with an emphasis on hands-on learning.

Ferris is committed to ensuring that students gain real-world skills outside of the classroom. The university works with numerous external partners, including alumni, industry and professional leaders, for program direction and networking advantages. It also requires program-related internships in most of its degree programs. As a result, the majority of students enrolled in

Bachelor's or more advanced degree programs participate in internships that support their personal and professional growth.

Ferris State also partners with industry leaders to maintain state-of-the-art equipment and technology. Its instructional and supportive spaces include the following high-quality facilities:

- Centers for Welding Excellence and Advanced Manufacturing (Aug. 2018)
- College of Pharmacy Center for Innovational Learning and Research
- Dow Interactive Eye Learning Center
- Ferris Library for Information, Technology and Education
- Granger Center for Construction and HVACR
- Heavy Equipment Lab
- Information Security and Intelligence Digital Forensics Lab
- Molecular Diagnostics Lab
- National Elastomer Center
- Shimadzu Core Laboratory
- Television and Digital Media Production Studio

Ferris offers a number of facilities to support amenities for commuter and residential students, including University Center, its popular student union and activity space.

1.1.1.2 CONSTRUCTION TECHNOLOGY AND MANAGEMENT PROGRAM (CTMG)

Ferris State University has offered construction-related education for over 40 years. Initial programming began at the associate degree level with Architectural Technology in 1954, Surveying Technology in 1958, Construction Engineering Technology in 1960 and Building Construction Technology in 1968. Baccalaureate programming began in 1973 with the BS in Surveying (now Surveying Engineering).

Development of a baccalaureate degree in Construction Management began in the late 1970's. The Construction Management program was designed as an upper division (third and fourth year) sequence leading to the BS degree for graduates of the Associate degree programs in Architectural Technology, Construction Engineering Technology, and Building Construction Technology. The BS Construction Management program was implemented in the fall quarter of the 1981/1982 academic year. During the 1990/1991 academic year, Construction Management courses were first offered to individuals working in the construction industry at the Ferris State University campus in Grand Rapids, Michigan, allowing these individuals to pursue a BS Construction Management degree by attending evening classes. Two certificate programs in construction, based on BS courses, were offered at the Grand Rapids campus. All ATC courses have traditionally been taught by regular program faculty.

In fall 1993, Ferris State University changed from quarters to semesters. At that time, a new BS degree in Construction Management (0+4) was instituted for incoming students committed to pursuing the full baccalaureate degree only. The AAS in Construction Engineering Technology became the AAS in Civil Engineering Technology at this time while the AAS in Building

Construction Technology remained. In fall 1996, the curriculum was revised to create two distinct tracks (Commercial/Industrial-CMBT and Highway/Heavy-CMCT). This revision also made the transition from the Building Construction Technology and Civil Engineering Technology associate degree programs to the BS Construction Management transparent (a return to true 2+2 programming). The transition from the Architectural Technology associate degree to the BS Construction Management is a minimum at 2+2.5 in order to include essential first and second year courses, but it can be completed as a 2+2 if specific Construction Management courses are worked in with the Architecture courses.

We have since completed another curriculum revision, effective for the 2017-2018 academic year. The revision included reviewing all courses content, incorporating the new ACCE Student Learning Outcomes, and reflected on where material should be introduced, reinforced, and in some cases mastered.

The BS in Construction Management is a 2+2 program – so all students earn 2 degrees. All students complete a 2-year Associates degree in their area of interest and then can continue on to the next 2 years to complete the Bachelor degree. This enables the program to be eligible for Perkins funding (one-time dollars used to purchase equipment and grants that provide recruiters/career counselors to help increase the female presence in non-traditional programs).

The two Associate's degrees are: Building Construction Technology (AAS - BCTM) and Civil Engineering Technology – Highway Emphasis (AAS – CETH) both of which feed into the Bachelor of Science in Construction Management (BS CONM). FSU's AAS in Architectural Technology can also be used as an entry degree to the Bachelor degree in Construction Management. Course Learning Objectives have been revised to reflect ACCE's 20 Student Learning Outcomes (SLO's).

1.1.1.3 MAJOR EMPHASIS OF THE DEGREE PROGRAM

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

Students have the option to focus on building or civil (roads) construction for 4 classes within their Associate in Applied Science degrees. All students take the same construction classes in their first year. The 4 separate classes occur in their sophomore year. This gives students the opportunity to change their AAS degree focus between buildings and civil (and vice versa) after 1 year of exposure to primary construction classes. All courses considered "core" to both Associate's degrees have a CONM designation which continues into the junior and senior year

1.1.1.4 DESIGNATED ADMINISTRATOR

Richard Goosen, Interim Dean of the College of Engineering Technology*

Robert Eastley, Director of the School of Built Environment

Suzanne Miller, Program Coordinator (coordinates the Program, but does not have "administrative" responsibilities)

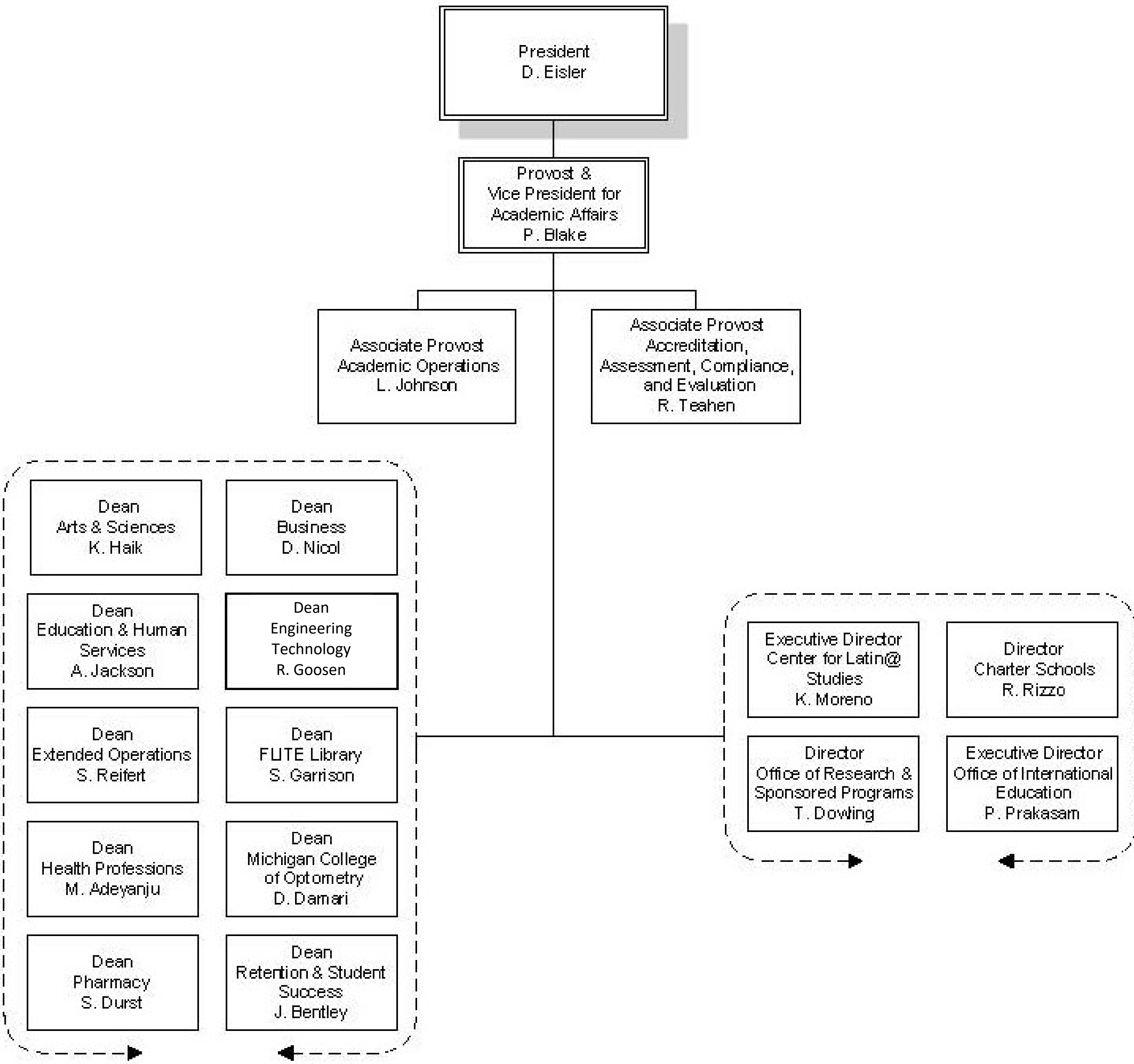
*Our current Dean, Larry Schult is retiring after 5 years in the position. The Provost has indicated that the position of Interim Dean will be held for 1-2 years as the College confirms its long term direction and infrastructure. At that time, a new Dean will be sought to implement the desired long term direction.

SECTION 2

GOVERNANCE AND ADMINISTRATION

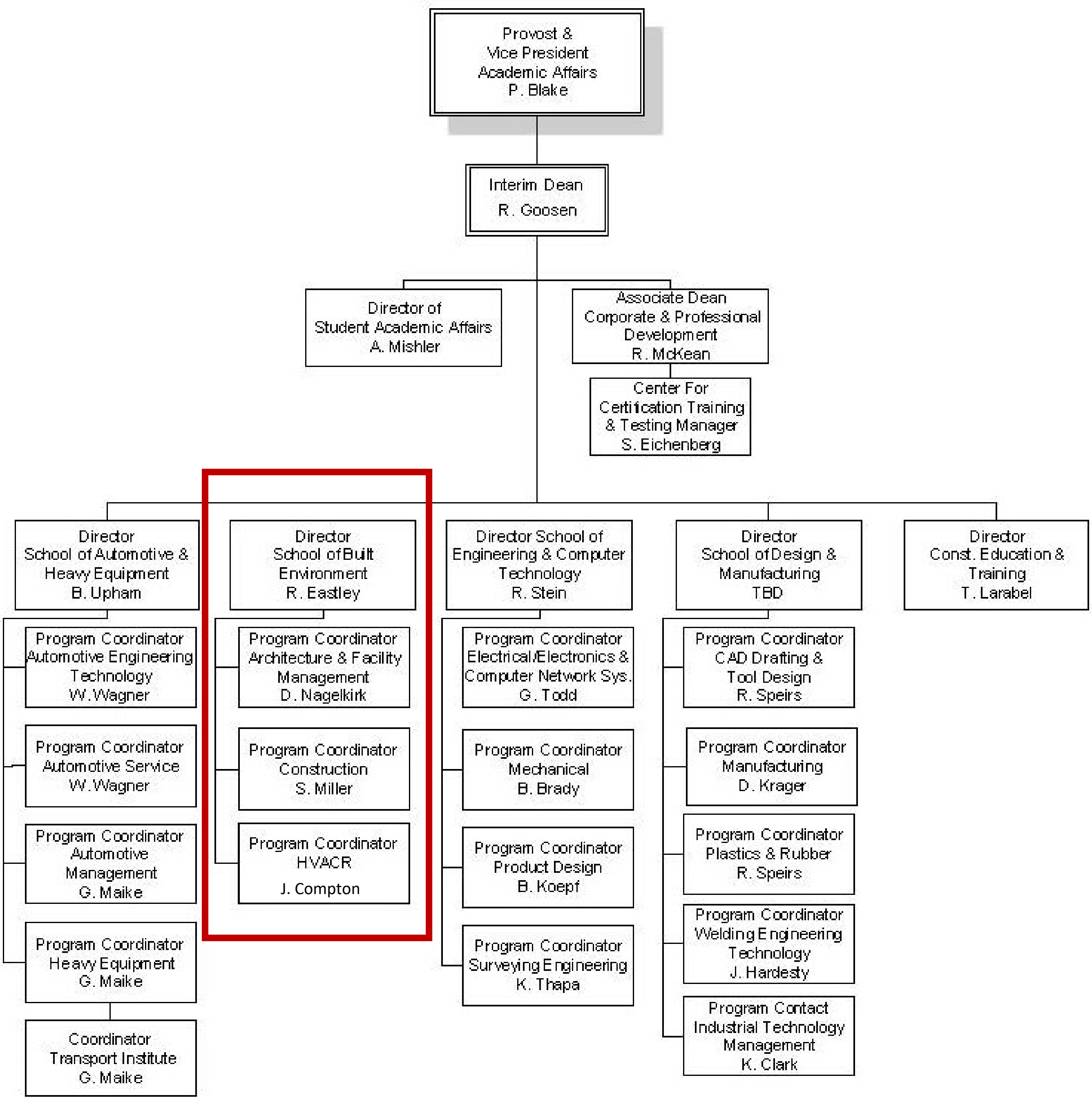
2.1 REQUIREMENTS
2.1.1 INSTITUTIONAL ORGANIZATIONAL STRUCTURE
2.1.1.1 ACADEMIC AFFAIRS
2.1.1.2

The organizational structure of the Academic Affairs Division of Ferris State University is as follows:

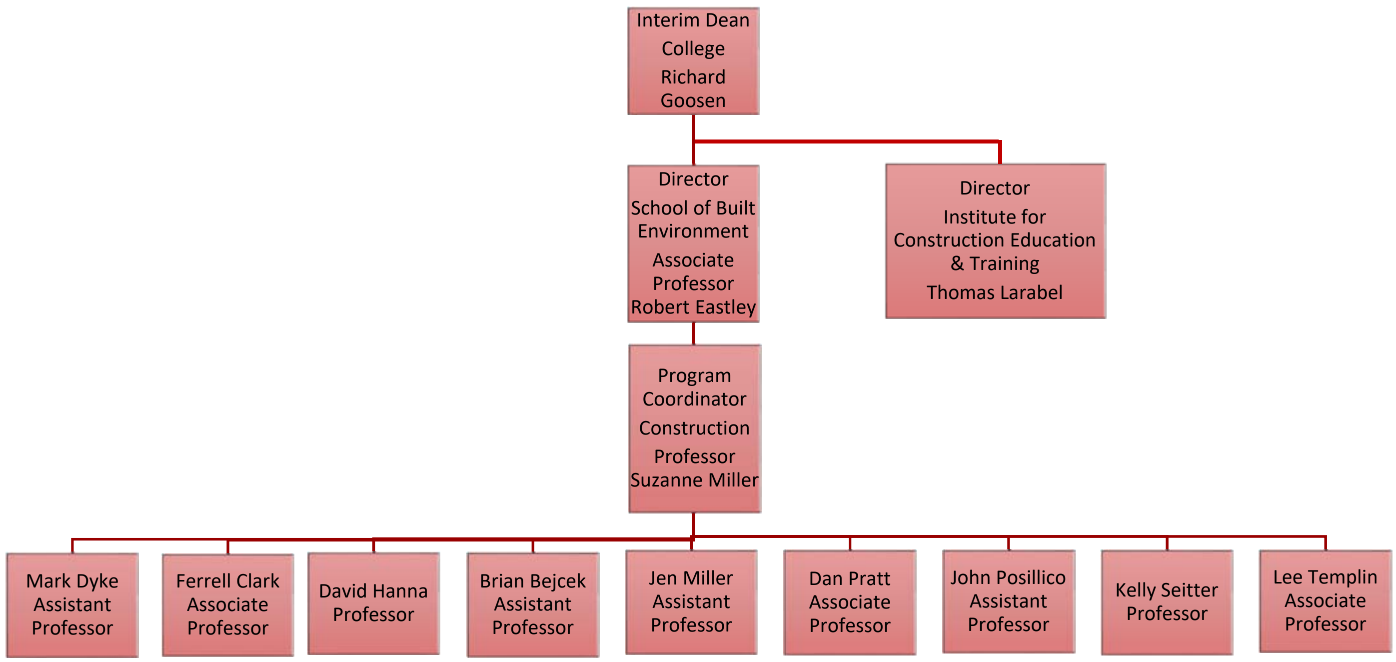


2.1.1.3 COLLEGE

The structure of the College of Engineering Technology (CET) is shown below. There are four Schools within the CET. The School of Built Environment (SBE) houses the Architecture, Facility Management, HVACR and Construction Programs. Programs are identified by their primary major in the chart below. Thus, "Construction" is the Construction Technology & Management Program. Within the Program are the three degrees: AAS in Building Construction Technology and AAS Civil Engineering Technology – Highway Emphasis both of which feed into the Bachelor of Science in Construction Management.



The Construction Technology & Management Program's Structure is as follows (with faculty titles current for Fall 2018):



2.1.2 EDUCATIONAL UNIT AUTONOMY, STRUCTURE AND LEADERSHIP

2.1.2.1 PROGRAM AS AN ENTITY

The Construction Technology & Management Program (hereby referred to as the "Program") is a distinct and identifiable entity at Ferris State. It is responsible for 3 degrees – AAS in Building Construction Technology, AAS in Civil Engineering Technology – Highway Focus, BS in Construction Management. Students can apply through Admissions to be accepted into the Program. The Program has a budget allocated by the Dean of the CET.

2.1.2.2 ADMINISTRATOR'S QUALIFICATIONS

Robert Eastley is the Director of the School of Built Environment (SBE). He holds faculty status and teaches 0.25 load. The other 0.75 load is devoted to administrative duties within the SBE. Mr. Eastley is a Professional Engineer and Associate Professor. The Program Coordinator, Suzanne Miller, holds faculty status and teaches 0.50 load with the remainder of her time spent coordinating the Program. She is a Registered Architect and Professor. Both have over 10 years of industry experience and over 12 years of teaching experience each.

2.1.2.3 ORGANIZATIONAL STRUCTURE FUNCTIONS

Four Schools make up the College of Engineering Technology. They are designed to encourage communication between the four Directors, the Program Coordinators and the Dean. Regular meetings are held to discuss issues such as budgets, student recruitment and shared initiatives.

School Directors are responsible for budget, faculty evaluations, coordinating the hiring process, external relationships, and representing the School. Within the School of Built Environment

(SBE), faculty from one program area often teach courses for students in another School program. In addition, student competition teams are frequently comprised of students or aided by faculty from more than one program area or discipline.

The Program Coordinator is the representative of the Program that is responsible for recruiting, advising all incoming transfer students, upholding Program admission standards, coordinating transfer guides and articulation agreements with community colleges, coordinating assessment and accreditation activities, assisting in Program budget development, coordinating new faculty tenure committees, cultivating outside relations, coordination of student awards and scholarships, faculty workload development, and semester schedules. The Program Coordinator also initially completes all transfer course evaluations for equivalency within the program.

2.1.2.4 DEFINITION OF EDUCATIONAL UNIT AND LEADERSHIP STRUCTURE

The Educational Unit is the Construction Technology & Management Program or "Program" which is responsible for 3 degrees – (2) AAS degrees and (1) BS degree in Construction Management. The leadership structure consists of a Program Coordinator who reports to the School Director who reports to the Dean of the College of Engineering Technology. .

2.1.3 FACULTY PARTICIPATION

2.1.3.1 GOVERNANCE AND ADMINISTRATION

The Program faculty participate in the governance of the School of Built Environment (SBE) and the Program on several levels. First, the School Director is elected by majority vote of all School faculty every three years. Likewise, the Construction Program Coordinator is elected every three years by majority vote of faculty with the Construction programs. Regular meetings of the SBE are scheduled to allow discussion of concerns and sharing of information. Meetings of the Program are held at least bi-weekly. All issues, including course assignments, financial expenditures and curricular changes are discussed and voted on at these meetings.

- Faculty member David Hanna has served as an elected member of the Academic Senate representing the College of Engineering Technology for the past 15 years.
- Faculty member Dan Pratt has served on the Academic Policies and Standards Committee
- Multiple faculty members have served on various curriculum committees ranging from the School level to the College level.

2.1.3.2 DEGREE PROGRAM MAINTENANCE AND ADMINISTRATION

The Program faculty meet at least twice a month to address any issues involving the program. Faculty vote on decisions that impact the program including faculty travel, hiring, some program expenditures, workload agreements, teaching credentials, and the curriculum.

The Program faculty were specifically involved with the development of the new curriculum that was implemented Fall 2017. The faculty spent 2 years reviewing the new ACCE outcomes, determining how to implement them into the Program, reviewing all existing courses for content and applicability to the Program and the assessment methods to be used to determine program performance. Bi-monthly meetings that lasted 4-5 hours were held over a 1 ½ year period. The final product represented a consensus agreement by the full faculty. The 2016-2017 academic year was spent steering the new curriculum through the University's curriculum process.

2.1.4 CONTRIBUTION TO THE INSTITUTION

2.1.4.1 EDUCATIONAL UNIT AND DEGREE PROGRAM CONTRIBUTION

The School of Built Environment (SBE) and the Program contribute to the Mission of Ferris State University. Ferris State University's Mission statement is as follows:

> ***Ferris State University prepares students for successful careers, responsible citizenship, and lifelong learning. Through its many partnerships and its career-oriented, broad-based education, Ferris serves our rapidly changing global economy and society.***

The Program has a hands-on, practical curriculum that prepares students for a wide variety of career options in the construction field. It emphasizes hands-on with its many lab-based classes. The courses have a career focus because the faculty all have real world experience which they bring into the classroom to engage students. The Program's focus on ethics throughout multiple classes and community service opportunities through its student group prepare students for responsible citizenship. The Bachelor degree requirements of Ferris State University and the ACCE requirements provide a broad-based educational experience for students. Ferris requires nine (9) credits in cultural courses (such as art, music, literature, history, film) and nine (9) credits in self and society (such as geography, anthropology, psychology, economics) for all Bachelor degrees.

The program has strong connections to industry, resulting in internships and career employment following graduation. Industry has also supported the Program within the University regarding faculty needs.

SECTION 3

CURRICULUM

3.1 CURRICULUM

3.1.1 DEGREE PROGRAMS

3.1.1.1 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.

3.1.1.2 NEEDS OF SOCIETY AND THE CONSTRUCTION PROFESSION

All of this results in graduates that are in demand and, to quote many of our employers, "ready to start producing their first day of work." The world will always need builders – automation and technology can only do so much. Construction and reconstruction of buildings and infrastructure help keep our economy producing and provide a basic requirement of life – shelter.

We have a 100% placement rate within 3 months of graduation with construction companies from all over the country. Most are repeat employers, indicating that we are providing the construction industry with what they believe they need. Often, once a Ferris graduate is hired into a company, the company will continue to regularly recruit from our program.

Our students are prepared to help lead those companies to complete successful projects. Nearly 50% of our graduates indicate a desire to be a superintendent on projects – heavily involved with the day-today field operations. They are not afraid to use their hands as well as their minds. The balance are interested in project management and pre-construction.

3.1.1.3 NUMBER OF HOURS REQUIRED FOR THE BACHELOR OF SCIENCE IN CONSTRUCTION MANAGEMENT DEGREE

122-123 total credits

Core Area	ACCE Minimums	Construction Technology & Management Degree Program
3.1.2 General Education		
3.1.2.1 Communications	6	12
3.1.2.2 Mathematics greater than Algebra and Trigonometry	3	3
3.1.2.3 Physical Science – Analytical physical science	6	7-8
3.1.3 Business and Management Accounting, Economics, Business Law and Principles of Management	12	12
Total combined 3.1.2 and 3.1.2	33	34-35
Total External to the Program	33	34-35
3.1.4 Construction	50	73
Other	37	15
	120	122-123

3.1.2 GENERAL EDUCATION

3.1.2.1 COMMUNICATIONS

ENGL 150 – English I – 3 credit hours – College of Arts and Sciences

Organize and develop papers for diverse audiences and purposes; including how to discover and focus on a topic, develop ideas, gather support, and draft and revise papers effectively. Fundamental language skills and introduction to library research and argumentation.

Pre-Requisites: ENGL 074 or a minimum score of 14 on ACT or a minimum score of 370 on pre 2016 SAT or 450 on SAT Evidence Based Reading and Writing. Meets General Education requirements for Written Communication

ENGL 211 – Industrial and Career Writing – 3 credit hours – College of Arts and Sciences

English 211 is a basic course designed to prepare the student to write successfully on the job as an employee or a first-line supervisor. It includes basic forms of business and technological writing to assist the student in developing sound communication practices. This course meets General Education requirements: Communication Competence, and new Fall 2017 Written Communication.

Pre-Requisites: ENGL 150 with a grade of C- or better.

ENGL 311 – Advanced Technical Writing – 3 credit hours – College of Arts and Sciences

An advanced course designed to train the student as a technical communicator. The student is taught to present technical concepts, facts, data analysis and evaluation to both a scientific or technical audience. Included are skills in editing, organization, and development of technical articles for publication, abstracting, proposals, memorandum reports, project/progress reports, technical descriptions, professional and technical letters, and the protocols of formal research reporting. Meets General Education requirements for Written Communication.

Pre-Requisites: ENGL 211 or ENGL 250 with a grade of C or better.

COMM 121 – Fundamentals of Pubic Speaking – 3 credit hours – College of Arts and Sciences

Training and experience in preparation and delivery of short speeches with emphasis on the clear, concise, logical communication of ideas. Emphasis will be placed on informative and persuasive speaking. Meets General Education requirements for Oral Communication.

3.1.2.2 MATHEMATICS

MATH 132 – Calculus for Business – 3 credit hours – College of Arts and Sciences

A study of both differential and integral calculus. Topics to be covered include: maxima & minima problems with business applications, curve sketching, exponential growth & decline and differential equations.

Pre-Requisites: MATH 120 or MATH 122 or MATH 126 grade of C- or better, or 26 on ACT or 590 on pre 2016 SAT or 620 post 2016 SAT

3.1.2.3 PHYSICAL SCIENCE

PHYS 211 – Introductory Physics I – 4 credit hours – College of Arts and Sciences

Basic concepts and applications of motion, force, energy, fluids, heat and sound. This course meets General Education requirements: Scientific Understanding, Lab, and new Fall 2017 Natural Sciences and Natural Sciences Lab.

Pre-Requisites: MATH 116 or 120 with a grade of C- or better or 26 on ACT or 590 on pre 2016 SAT or 610 post 2016 SAT

The Program accepts any one of the four following physical sciences classes for a 2nd scientific understanding lab course:

- **CHEM 114 – Introduction to General Chemistry** – 4 credit hours – College of Arts and Sciences

  A survey course covering the major topics of general chemistry relevant for biological or allied health applications, including atomic structure, chemical bonding, interpretation of equations, solution chemistry, and an introduction to acids and bases. Concurrent laboratory sessions will include experiments illustrating the principles discussed in lecture. This course meets General Education requirements: Scientific Understanding, Lab and new Fall 2017 Natural Sciences and Natural Sciences Lab. A year of HS chemistry substitutes for CHEM103 Pre-Requisites:CHEM103 with a grade of C- or better or year of HS Chemistry & MATH110 with a grade of C- or better or ACT 19 or pre 2016 SAT 460 or post 2016 SAT 500

- **GEOG 111 –Geography of the Physical Environment** – 4 credit hours – College of Arts and Sciences

  Study of the natural habitat in which people have developed economic, cultural, and political structures. Emphasizes maps showing world patterns of climates, landforms, surface waters, soils and earth materials, and vegetation. This course meets General Education requirements: Scientific Understanding and new Fall 2017 Natural Sciences and Natural Sciences Lab

- **GEOL 121 – Physical Geology** – 4 credit hours – College of Arts and Sciences

  Explores the processes that continuously interact to cycle rock and water through the earth system, thus shaping the surface of our dynamic earth. Plate tectonics is the thread that ties the study of earthquakes, volcanoes, and mountain belts; weathering, erosion, and deposition. The interrelation of humans and the earth system is a recurring theme. This course meets General Education requirements: Scientific Understanding, Lab and new Fall 2017 Natural Sciences and Natural Sciences Lab

- **PHSC 110 – Inquiry into the Earth System** – 4 credit hours – College of Arts and Sciences

  This introductory course explores important concepts of geology, oceanography, meteorology and astronomy in order to understand Earth as a system in which land, water, air and space continually interact through the exchange of matter and energy to form our physical environment. The impact of humans on the earth system is an important theme throughout the course. This course meets general education requirements for scientific understanding.

- **PHYS 212 – Introductory Physics II** – 4 credit hours – College of Arts and Sciences

  Continuation of PHYS 211. Basic concepts and applications of electricity, magnetism, light and modern physics. This course meets General Education requirements: Scientific Understanding, Lab, and new Fall 2017 Natural Sciences and Natural Sciences Lab.

  Pre-Requisites: PHYS 211 with a grade of C- or better

3.1.3 BUSINESS MANAGEMENT

3.1.3.1 BUSINESS AND MANAGEMENT COURSES

ACCT 221 – Principles of Construction Accounting – 3 credit hours – College of Business

An introductory course for construction management major to learn the design, analysis, and output of construction accounting systems. Students also learn how to report the results of operations, analyze the financial statements produced and use the analysis to bid and budget future projects.

Pre-Requisites: MATH 115 (College Algebra) with C-/better or ACT 24 or pre 2016 SAT 560 or post 2016 SAT MATH 580; & Construction Management students

BLAW 301 – Legal environment of Business – 3 credit hours – College of Business

Develops an understanding of the interaction between law and business through a survey of public and private law. Emphasis on understanding business regulation in the areas of competition, labor law, securities regulation, consumer protection, and environmental law. A brief overview of contracts and business organizations is included along with a review of the court system and the constitutional rights of business.

ECON 221 – Principles of Macroeconomics – 3 credit hours – College of Business

Scope and meaning of economic principles basic to a free market economy. Equilibrium price formation and the efficiency of resource allocation in a market economy. National income accounting; determination of equilibrium national income, recession, and expansion. Government policy toward economic fluctuation; unemployment and inflation. The role of money and banking in recession and inflation. This course meets General Education requirement: Social Awareness; Social Foundations, and new Fall 2017 Self and Society, and Self and Society Foundation.

Pre-Requisites: MATH 109 or 110 with a grade of C- or better or MATH 114, 115, 116, 117, 118, 119, 120, 122, 126 or ACT of 19 or MATH score of 460 on the pre 2016 SAT or 500 post 2016 SAT

We accept any one of the four following Management courses for our degree:

- **MGMT 302 – Team Dynamics** – Organizational Behavior – 3 credits – College of Business

  Explores the fundamental processes and skills essential for the success of individual and group/team behavior in contemporary organizational settings. MGMT 302 emphasizes the importance of team formation and decision making, effective conflict management, and the impact of diverse individual personality and cultural backgrounds on team and organizational success.

  Pre-Requisites: Sophomore Standing

- **MGMT 305 – Managerial Leadership** – 3 credit hours – College of Business

  This course will focus on applying leadership behaviors to management practices. Using theoretical and practical methodology students will critically analyze, identify, and creatively apply leadership & management techniques. A practical, experiential learning approach is emphasized and crucial to the success of the course. Students will gain first-hand experience in resolving workplace conflict, ethical dilemmas, cultural bias, and other professional tensions through participating and completing community service projects, team role playing, case analysis, and discussion related assignments. Self-assessment and constructive peer/superior feedback will allow students to identify their existing strengths and weaknesses. Students will be well-prepared to contribute to any professional organization using the numerous skills, knowledge, and abilities they obtained from taking the course.

  Pre-Requisites: Second Semester Sophomore Status

- **MGMT 310 – Small Business Management** – 3 credit hours – College of Business

  Fundamentals of starting and operating a successful small business. Traces the development of a business from the entrepreneurial concept to the profitable operating stage. Provides opportunities to discuss and solve small business problems in such areas as marketing, personnel, finance, and operations.

  Pre-Requisites: Second Semester Sophomore Status

- **MGMT 373 – Human Resource Management** – 3 credit hours – College of Business

  Course focuses on the objectives, functions, and organization of Human Resource systems including: equal employment opportunity, job analysis, selection, training, compensation and benefits, performance management, employee rights and discipline, workplace safety and health, and labor relations.

  Pre-Requisites: Sophomore Standing

3.1.3.2 EXPLANATION OF DIFFERENCE BETWEEN BUSINESS AND MANAGEMENT COURSES AND TOPICS TAUGHT IN THE PROGRAM

Accounting is taught by the College of Business, teaching the basic concepts of accounting, but with a construction focus as though the student is the owner of a construction company. We do not specifically teach accounting in our program with our own faculty. Pay applications and progress payments are addressed in CONM 222 Construction Administration (a required course).

Business Law is focused on the general understanding of how law impacts business, specifically business regulations, labor law, law and environmental law. It is now a prerequisite course to our CONM 412 Construction Contracts class which delves into contract provisions and standard construction contract language.

Economics taught by the College of Business looks specifically at basic economic principles that drive a free market economy, no matter the type of business. CONM 413 Construction Economics taught by our program emphasizes the time value of money and is similar to Engineering Economics courses taught at other universities, with a construction slant by using construction items to help students visualize the theories being taught.

The different 300-level Management electives taught by the College of Business and accepted by the Program allow the student to focus on either owning their own small business, the human resources aspect of owning your own business or being responsible for hiring and firing, working within a team (understanding different behaviors of individuals) or leadership skills/behaviors for individuals in managerial positions.

3.1.4 CONSTRUCTION

CONM 111 – Construction Practices – 3 credits
Exposure to materials, methods and equipment used on heavy and commercial construction projects. Site layout, foundations, structural components of a project, quantity takeoff, material ordering and basic construction codes are introduced.

CONM 112 – Plans & Specifications – 3 credits
Introduction to the interpretation of plans, specifications, and building codes for commercial/industrial buildings and major civil projects. The design process and how plans and specifications are developed and interrelated is explained. Basic quantity takeoff methods are introduced.

CONM 116 – Construction Graphics – 2 credits
A foundation course utilizing basic and complex construction graphics methods used to: communicate; understand ideas and concepts found in construction; and solve graphical representations required to explain the details of building a project. This course familiarizes the student with fundamental principles of construction graphics using hard line, freehand sketching, three-dimensional modeling, and basic computer modeling techniques. This course includes the development of orthographic presentations, isometric drawings, freehand drawings, dimension clarity, and three-dimensional models.

CONM 117 – Construction Building Information Technology – 3 credits
This course will review basic micro application software including Windows type operating systems, word processing, spreadsheets, and presentation software and will introduce the basic principles of Building Information Technology. Students will examine geometry, spatial relationships, geographic information, quantities and properties of building components

CONM 121 – Materials Properties & Testing – 3 credits
Application and properties of construction materials. The sampling, testing and application of the physical properties of aggregates and Portland cement concrete; bituminous materials, metals, and wood.

CONM 122 – Construction Surveying – 3 credits
Fundamentals of construction surveying, including distance measurement, leveling, angular measurement, traversing, topographic surveying, volume calculations, circular curves, building and roadway layout and grading.

CONM 211 - Construction Estimating I - 3 credits
The study of the elements involved in the preparation of the contractor's bid proposal. Determine quantity takeoff, crew sizes, daily outputs, unit costs and organization of the bid packages into general contracted and subcontracted work. Discuss the ethics of bidding and prepare a bid proposal. Incorporate industry technology into the estimating process.

CONM 212 – Soils & Foundations – 3 credits
An introduction to the principles of soil mechanics including soil compaction and load bearing. The origin and engineering characteristics of soil, soil classification systems, the strength of soil masses, control of structural embankments and an introduction to the design of foundations will be emphasized.

CONM 221 – Statics & Structures - 3 credits
Statics and strength of materials as they relate to the design and construction of structural components, including stress-strain, tension and compression, elasticity, shear, bending, and deflection of beams, centroids, moments of inertia, welded and bolted connections, friction, thermal expansion, and truss analysis.

CONM 222 – Construction Administration – 3 credits
An introduction to project documentation and on-site administration procedures for construction projects. Apply construction documents and project planning methods. Acquire knowledge of the structure of the construction industry and project delivery systems. The importance of project administration procedures for time, cost, and quality control during the construction process is emphasized. Prepare documentation for changes in the construction process.

CONM 225 – Field Engineering – 3 credits
Management of the construction site, including planning and layout of temporary and permanent site facilities, field engineering calculations, project documentation, regulatory requirements and sustainable construction practices.

Students select either the following 4 BCTM classes if they are focused on building construction or the 4 CETM classes if they are focused on civil construction with a highway emphasis:

- **BCTM 213** – Wood & Steel Framing and Finishes – 3 credits
  The study of basic framing and finish techniques and the materials and methods used in the construction industry. Apply the principles of construction mathematics to layout and assembly of structures consisting of wood and steel beams, joists, studs, rafters, stairs and other framing/enclosure components.

- **BCTM 217** – Virtual Design and Construction – 3 credits
  Utilizing the emerging computing and information technologies used in the solution of construction problems and in construction management, this course will expose students to the creation and integration of virtual models used in design, construction, estimating, scheduling, and facility management.

- **BCTM 234** – Electrical Construction Practices – 3 credits
  Interpret construction documents for electrical service and distribution, fire protection, building security and signaling, and building automation systems in construction including site utilities. Knowledge of major materials and construction installation requirements. Coordination of electrical trades on the jobsite. Basic system design, operation and code related information. Preparation of construction takeoffs and preliminary estimates.

- **BCTM 235** – Mechanical Construction Practices – 3 credits
  Interpret construction documents for plumbing, piping, fire suppression and mechanical systems used in construction including site utilities. Identify major materials and construction installation requirements, including basic system design, operation and code-related information for preparation of construction takeoffs and preliminary estimates. Discuss construction site issues including trade coordination, installation, and testing of mechanical and piping on the jobsite. Practice basic construction techniques common to the above systems including preparation of preliminary estimates.

OR

- **CETM 214** – Advanced Materials Properties & Testing – 3 credits
  An advanced course in the application of aggregate characteristics, specifications, and testing and the design, analysis and application of hot mix asphalt and concrete. Michigan Department of Transportation specifications, testing procedures, and technician certification programs are emphasized.

- **CETM 215** – Construction Equipment & Operations – 3 credits
  Fundamentals of construction equipment ownership and operation. Topics include ownership and operating costs, earthwork fundamentals.

- **CETM 226** – Highway Technology – 3 credits
  Basic techniques and procedures of highway design and pavement structural analysis. Planning processes for highway projects. Plan development utilizing current industry standard software emphasized.

- **CETM 227** – Hydraulics & Hydrology – 3 credits
  The study of fluid mechanics, hydrostatics, open channel flow, pipe flow, pumping, flow measurements, and flow through hydraulic structures, and the principles of hydrology including precipitation, statistical methods and runoff.

CONM 311 – Formwork & Temporary Structures – 3 credits
Design, erection, use and removal of temporary structures used in the construction industry with an emphasis on concrete formwork. Basic rigging operations introduced.

CONM 312 – Construction Scheduling – 3 credits
Develop construction planning and scheduling techniques, including work breakdown, crew analysis and productivity, activity time-cost relationships, project time-cost relationships, resource leveling, overlapping activity relationships and lag, and project cash flow. Computer application is used as a scheduling tool throughout the course.

CONM 321 – Construction Estimating II – 3 credits
The development of unit prices for estimating labor, material and equipment unit price development, productivity adjustment factors, overhead and profit, cash flow, and interest calculations, conceptual estimating methods, and cost variance analysis.

CONM 324 – Advanced Construction Computer Techniques and Technology – 3 credits
Understanding emerging technologies used in the solution of construction problems and in construction management. This will include PC-based office software; project management software; and new industry technologies.

CONM 373 – Ethics and Professionalism in Construction – 1 credit
The study of professional ethics and leadership as related to the construction industry. Discusses the codes of ethics adopted by many technical societies. The course explores the meaning and attributes of professionalism along with the moral, ethical, and social responsibilities of professional constructors. This course may be team taught by several or one Construction Management faculty.

CONM 412 – Construction Contracts – 3 credits
The study of the construction contract as it relates to the administration of the construction project. Review of standard documents used in the construction industry. Interpretation of required administrative procedures and the evaluation of contractual risk.

CONM 413 – Construction Economics – 3 credits
Economic and financial factors in the construction industry environment to be considered in managerial decision making. Emphasizes the time value of money concept. (mixed delivery)

CONM 424 – Construction Safety & Management – 3 credits
Construction Safety and Management techniques used to manage people, resources and safety at the construction site. Safety topics, professional ethics, productivity, motivation, communication styles, leadership, time management and team building skills addressed.

Students select 2 of the following courses in the CONM 46- sequence:

- **CONM 460 – Current Topics in Construction Management** – 2 credits
  The course dynamics and study topic will vary based upon contemporary problems, issues, or trends impacting the construction industry at the time of the course. Advanced technology, management techniques and efficiencies, and business focus will be investigated depending on the course topic. Student assessment will be determined by demonstration their overall grasp of the problem analysis, possible solutions, and communication of study results. Depending on selected project, cross functional team role playing may be utilized.

- **CONM 461 – Sustainability in Construction** – 2 credits
  A study of the basic concepts and principles of sustainability utilized in the design and professional construction industry. Review methodology used to measure sustainable energy, materials, water management, and the construction environment. Examine the different methods for rating sustainable building "green" rating systems.

- **CONM 462 – Power and Process Plant Construction** – 2 credits
  Study of the construction and basic engineering design of power generating plants and process plants. Review of major equipment and facility requirements with plant layout and arrangement. Emphasis on construction of power and process plants including materials and methods of construction with on-site management of the construction process.

- **CONM 463 – Civil Infrastructure** – 2 credits
  Study of basic civil engineering design and on-site construction issues for construction projects. Use of construction documents and project planning methods. Study of engineering material systems with construction methods.

CONM 499 – Construction Project Management – 3 credits
The Construction Management program capstone course leading to the award of an ACCE accredited Bachelor of Science degree in Construction Management. Students explore the roles and tasks of the professional construction manager. Student work is intended to be applied in a holistic manner using all previously developed construction program coursework. Project management issues within a decision making and problem solving context are included in a semester-long simulation of an actual construction project in a student team environment. Assessment of the student team projects include a professional presentation to industry standards conducted by a team of faculty and several construction industry representatives.

3.1.5 STUDENT LEARNING OUTCOMES

3.1.5.3.A COURSE LEARNING OUTCOMES RELATED TO STUDENT LEARNING OUTCOMES (SLO's)

See Appendix D for the curriculum map showing the relationship between the course learning outcomes and the ACCE Student Learning Outcomes (SLO's)

As noted in the tables, some courses assess individual outcomes more than one time.

Most outcomes are assessed in at least 2 classes that are required for all students, regardless of the focus of their Associate's degree. ACCE SLO #18 Sustainability is currently addressed in CONM 225 Field Engineering. However, it was missed in the outcomes approved by the curriculum proposal. It will be added to the outline and submitted to the University Curriculum Committee in the fall 2018 semester.

It is important to note that the AAS degrees of the Program are an integral part of the Bachelor degree meeting the ACCE SLO's. As noted in the assessment mapping, many of the 200 level CONM courses ensure we are meeting the SLO's in more than one course. Students that transfer to Ferris for the BS in Construction Management typically have to take most of the 200 level CONM courses even if their AAS is in Construction or Construction Management.

There are some courses that are new to the Program with the curriculum revision that do not have assessment methods indicated at this time as the courses are not yet finalized. These include CONM 373, CONM 460, CONM 462, and CONM 463. CONM 461 has assessment methods indicated because the class is a condensed version of a previous course and thus

3.1.5.3.B COURSE OUTLINES

Course Outlines are available in Volume II. Each course outline includes: course learning outcomes in relation to the Student Learning Outcomes; instructional methods; topical outline; method of assessment of course learning outcomes.

The course outlines for the CONM prefix courses are listed first because they are courses taken by all students. CONM 100's outline is included, however, the outcomes are provided to the Program by the university as it is a freshman seminar course that is required of all incoming freshmen.

The course outlines for the four (4) BCTM and four (4) CETM prefix courses are included after the CONM courses. These are the courses that are specific to the two separate AAS degrees and are integral parts of the BS in Construction Management degree.

Grade performance criteria: Grades at Ferris State University adhere to the following:

100 – 90	A
89 – 80	B
79 – 70	C

69 – 60	D
59 – 0	F

The assessment grade performance criteria is that 70% of the students will achieve a 70% or greater on the assessment item.

3.1.5.3.C STUDENT LEARNING OUTCOMES – INDIVIDUAL COURSES WHERE SLO'S ARE INCLUDED

ACCE SLOs that are tied to course learning outcomes are indicated in each course outline under the section "Course Learning Outcomes". They are also listed in the Curriculum Course Learning Outcomes Map in Appendix D and in two different manners in Appendix E – by SLO first, then Course Number and also by Course Number first, then SLO.

3.1.5.3 D METHODS OF ASSESSMENT FOR EACH STUDENT LEARNING OUTCOME

The methods of assessment for each SLO are listed in Appendix F in Volume II. These methods of assessment are direct. They include: oral presentations, projects, written assignments, lab reports, and internal tests, all administered by faculty.

The senior exit survey and the Industry Advisory Board survey (sample also included in Appendix F), although indirect is also used as a method of assessment of each SLO.

3.1.5.3.E ASSESSMENT TOOLS, RUBRICS, GRADED WORK

See Appendix G in Volume II for examples of student work and grading rubrics

3.1.5.3.F STUDENT LEARNING OUTCOMES INCLUDED IN QUALITY IMPROVEMENT PLAN

Part of our senior survey asks for student input regarding each ACCE SLO

Part of our yearly review of the program includes looking at how well we are meeting the SLO's

See Appendix C for the Assessment Plan and Implementation Plan for the Program

3.1.5.3.G ASSESSMENT REPORTS FOR COURSE LEARNING OUTCOMES (INCLUDING STUDENT LEARNING OUTCOMES)

The following are the methods of assessment used in each class to achieve one or more ACCE SLOs. In the format provided by TracDat (Ferris State University's system for tracking assessment) there are 4 columns. In the first column, the outcome is defined and the ACCE SLO # is referenced. In the second column, the method of assessment and the criterion for success are listed. In the third column, the results are reported. The fourth column is for actions taken if the criterion for success is not met.

See Appendix H in Volume II for the actual report generated by TracDat for each course.

3.2 COURSES DELIVERED BY ALTERNATE FORMS OF DELIVERY

Not Applicable

3.3 MULTIPLE CAMPUS DEGREE PROGRAM DELIVERY

Our Bachelor of Science in Construction Management degree is offered on two Ferris State University campuses. The Grand Rapids campus is a closed cohort. It now runs on a 3 year cycle with two construction management courses offered each semester. The new cohort begins Fall 2018. The campus is located 50 miles from our main campus in Big Rapids.

Some students achieve their AAS in Building Construction Technology or Civil Engineering Technology – Highway Emphasis through Ferris and then join the cohort. Others complete their AAS in Architectural Technology through Grand Rapids Community College.

3.3.1 DEGREE IS ISSUED BY A SINGLE INSTITUTION

The degree is issued by Ferris State University.

3.3.2 PROGRAM ADMINISTRATOR

The Construction Technology & Management Program Coordinator is responsible for administration of the program with support from the School Director.

3.3.3 PROGRAM ADMINISTRATOR'S AUTHORITY

The Program Coordinator has the same responsibilities for the Grand Rapids campus as the Big Rapids campus.

3.3.4 ADEQUATE FACULTY AND STAFF

Full-time faculty or adjuncts from Big Rapids drive to Grand Rapids to ensure consistency of the program's content.

Ferris State University's Grand Rapids office provides office support staff to the program on the Grand Rapids campus.

3.3.5 DEGREE PROGRAM CURRICULUM

The degree program curriculum is essentially the same as Big Rapids, except for 5 introductory CONM (construction management) courses and the 4 building construction technology (BCTM) or civil engineering technology courses (CETM). The (5) CONM courses that are not taught by faculty on the Grand Rapids campus include: CONM 111 Construction Practices, CONM 112 Plans & Specifications, CONM 116 Construction Graphics, CONM 117 Construction Building Information Technology, and CONM 121 Materials Properties & Testing. Instead students who do not have an AAS from our program pursue an AAS in Architectural Technology through Grand Rapids Community College (akin to students that pursue an AAS in Architectural Technology through Ferris and transfer into the Program).

The students are accepted into the Bachelor degree program once they have completed 30 transferrable semester hours and have taken the equivalents of the 5 courses listed above. This is akin to the students that receive their AAS in Architectural Technology through Ferris State University and then join our Bachelor degree program.

The core construction management courses that account for meeting ACCE's SLO's are required courses for all students in the construction management program.

3.3.6-8 Not Applicable

3.4 DUAL OR SECOND DEGREES

Not Applicable

SECTION 4
FACULTY AND STAFF

4.1 REQUIREMENTS

4.1.1 FACULTY QUALIFICATIONS

4.1.1.1 QUALIFICATIONS

Faculty curricula vitae are included in Volume II – Appendix A.

All faculty have a Master's degree and industry experience. Master's degrees among the faculty vary from MSE in Construction Engineering & Management, MSE Civil Engineering, MSE Environmental Engineering, MBA, MS Career and Technical Education, MA Counseling. Industry experience is required to teach in our program and varies from bricklaying, surveying, civil engineering, architecture, construction management, owner's representative.

Our University is accredited by the Higher Learning Commission and follows their requirements for faculty assignments. The Higher Learning Commission

> "expects that accredited institutions will use credentials as the primary mechanism to ascertain minimal faculty qualifications. HLC recognizes that experience may also be considered in determining faculty qualifications."
>
> "Faculty teaching in higher education institutions should have completed a program of study in the discipline of subfield (as applicable) in which they teach, and/or for which they develop curricula, with coursework at least one level above that of the courses being taught or developed."
>
> "Tested experience may substitute for an earned credential or portions thereof…an institution to determine that a faculty member is qualified based on experience that the institution determines is equivalent to the degree it would otherwise require for a faculty position. This experience should be tested experience in that it includes a breadth and depth of experience outside of the classroom in real-world situations relevant to the discipline in which the faculty member would be teaching." ("Determining Qualified Faculty Through HLC's Criteria for Accreditation and Assumed Practices" – March 2016)

Please see Appendix I in Volume II for the teaching qualifications for each class within the program as determined by the faculty. The criteria are applicable to full-time, part-time, and adjunct faculty for consistency. Please note the acknowledgement of experience that can be used in lieu of a Master's degree in Construction Management to teach our 300 and 400 level classes.

See the chart below that summarizes degrees and work experience for each faculty member

Faculty Member	Bachelor Degree	Master's Degree	Full time Work Experience Prior to Ferris
Brian Bejcek	BS Mechanical Engineering	MS Electrical Engineering	9 years • Power industry – Generation Engineer • Project Manager • Director of Planning and Development
Ferrell Clark	BS Construction Management	MBA	20 years • Bricklayer • Carpenter • Superintendent
Mark Dyke	BS Construction Management	MA Counseling	20 years • Preconstruction
Robert Eastley	BS Civil Engineering	MS Civil Engineering	18 years • Engineer • Field Engineer
David Hanna	BS Marine Engineering	MS Environmental Engineering	22 years • Boilerman • Engineer • Project Manager
Jen Miller	BS Civil Engineering	MBA	19 years • Design Engineer • Project Manager • City Engineer
Suzanne Miller	BS Architecture BFA Industrial Design	• M Architecture • MS Construction Engineering & Management	10+ years • Intern Architect • Project Engineer • Superintendent • Project Manager
John Posillico	BS Construction Management	MS Organization Leadership	9 years • Owner's Rep • Project Engineer • Project Manager
Dan Pratt	BS Land Surveying	MBA	19 years • Surveyor • Project Manager

Faculty Member	Bachelor Degree	Master's Degree	Full time Work Experience Prior to Ferris
Kelly Seitter	BS Civil Engineering	MS Career and Technical Education	11 years • Engineer • Project Manager
Lee Templin	BS Civil Engineering	MS Construction Engineering & Management	11 years • Project Engineer • Project Manager

4.1.1.2 ASSIGNED TEACHING PROCESS

Faculty are assigned teaching responsibilities based on the following criteria:

- Degree
- Experience
- Personal interest
- Availability

4.1.1.3 FORMAL EDUCATION VS. PROFESSIONAL EXPERIENCE

Our program requires its faculty applicants to have a minimum of 5 years of full-time US construction experience in the commercial, industrial, or heavy civil industries. Degrees and industry experience are utilized when selecting teaching responsibilities. Industry experience has been acknowledged for its contributions to teaching in the teaching credentials portion required for each course. See Section 4.1.1.1

4.1.2 FACULTY SIZE

In the Fall 2018 semester, the Program will have 11 filled "faculty lines." Faculty lines are tenured or tenure-track positions. The Program hired a new tenure-track faculty member for the Fall 2017 semester, a new tenure-track faculty member for the Spring 2018 semester, and a new tenure-track faculty member who begins Fall 2018 (whose curricula vitae is included with the other faculty in Appendix A.

With one faculty member serving as the Director of the School of Built Environment with 0.75 release and one faculty member serving as the Program Coordinator with 0.50 release, that is the equivalent of 9.75 full-time employees.

4.1.2.1 TEACHING AND ADMINISTRATIVE ASSIGNMENTS FOR EACH FACULTY MEMBERS

Several faculty were on overload both the Fall 2017 and Spring 2018 semesters. It was lessened somewhat in the spring with the addition of a new faculty member and will be reduced further in Fall 2018 with our new faculty member. .

See Appendix J in Volume II for faculty teaching loads and overloads.

4.1.2.2 COMPARISON OF PROGRAM'S FACULTY SIZE TO COMPARABLE PROGRAMS AT FERRIS STATE UNIVERSITY

With the addition of a new faculty member in Fall 2018, the program's number of faculty compared to the number of students becomes closer to those seen for similar programs.

Fall 2017

PROGRAM	# OF STUDENTS	# OF FACULTY (FTE)
Architecture	125	6.5
Automotive	260	8.5 + technician
Construction	**274**	**7.75**
Electronics/CNS	113	4.5 + 1 technician
Heavy Equipment	105	3.5 + 1 technician
HVACR	197	8.5
Manufacturing Engineering	264	8.5 + 1 technician
Mechanical Design	318	4.5
Plastics & Rubber	206	5.5 + 1 technician
Surveying	70	3.75
Welding	185	4.5 + 1 technician

4.1.2.3 PROCESS TO DETERMINE WHEN NEW OR ADDITIONAL FACULTY ARE NEEDED

The need for new or additional faculty becomes apparent when enrollment is consistent or rising and the loads being assigned to faculty in the program exceed a total of over 24 credits or 36 contact hours annually spread over the fall and spring semesters. Faculty loads for the upcoming semester are determined approximately 6 months prior to the semester when course teaching assignments are made. The Program tracks enrollment numbers, numbers of sections offered, and the number of faculty teaching.

Once a need has been determined, the Program must complete a position justification indicating why a new position is needed and/or if the position of a retiring faculty member should remain with the Program. This is presented to the Dean who must make an initial determination as to whether the position should be given to or remain with a program. The Dean has the prerogative to take a position from one program within the college and assign it to another.

The Dean must then take the position request to the Dean's Council. The Dean's Council consists of the 7 college deans who must vote on whether the Program is allowed to add or retain a position or if the position should go to another college instead.

4.1.3 FACULTY WORK LOAD

4.1.3.1 PROCESS TO DETERMINE FACULTY WORKLOAD DISTRIBUTION

Faculty workload is determined by a number of factors including expertise in the subject, the number of sections required for each course, and the number of preps assigned to each faculty member. A full faculty load, per our contract, is 24 credits or 36 contact hours over the course of a year (9 months). This can mean that one semester a faculty member can be "under-loaded" (less than 12 credits or 18 contact hours) and the next semester be "overloaded" (more than 12 credits or 18 contact hours) and average out to fully loaded for the academic year.

The intended loads are reviewed with all faculty at a faculty meeting for their input prior to the establishment of a schedule.

4.1.4 ADMINISTRATIVE AND TECHNICAL STAFF SUPPORT

4.1.4.1 ADMINISTRATIVE AND TECHNICAL SUPPORT

The Program's Secretary is now shared with the HVACR Program and the School of Built Environment. She is the only full-time clerical staff, responsible for 20 faculty members and 457 students between our Program and HVACR. To the degree practical, a student worker is used (up to 10 hours per week), but many of the Program Secretary's responsibilities are above what can be given to a student worker, especially with FERPA rules.

4.1.4.2 PROGRAM'S SUPPORT COMPARED TO OTHER PROGRAMS AT FERRIS STATE UNIVERSITY

PROGRAM	# OF STUDENTS	# OF FACULTY	# OF SUPPORT STAFF
Architecture	125	6.5	1
Automotive	260	8.5 + technician	1
Construction	**274**	**7.75**	0.5
Electronics/CNS	113	4.5 + 1 technician	0.25
Heavy Equipment	105	3.5 + 1 technician	1
HVACR	197	8.5	0.5
Manufacturing Engineering	264	8.5 + 1 technician	0.5
Mechanical Design	318	4.5	0.5
Plastics & Rubber	206	5.5 + 1 technician	0.5
Surveying	70	3.75	1
Welding	185	4.5 + 1 technician	1

4.1.5 EMPLOYMENT POLICIES

4.1.5.1 PROGRAM'S FACULTY SALARIES COMPARED TO OTHER PROGRAMS AT FERRIS STATE UNIVERSITY

PROGRAM	PROFESSOR	ASSOCIATE PROFESSOR	ASSISTANT PROFESSOR
Construction	$112,830	$100,881	$74,000
	$104,600	$90,276	$74,000
	$100,661	$75,362	$73,800
	$90,345	$74,292	$73,800
Surveying	$106,692	$81,351	
Automotive	$92,244	$86,257	$71,920
Architecture	$104,090	$98,719	
	$113,821		
	$92,318	$90,492	
HVACR	$107,742	$77,881	$66,687
		$86,751	$66,687
		$83,699	
Electrical	$114,593	$91,108	
Manufacturing	$108,370	$88,033	$68,830
Welding	$116,749	$93,504	$68,872

4.1.5.2 CURRENT FACULTY

FACULTY NAME	TITLE	FTE	YEARS ON STAFF	TENURE STATUS	APPOINTMENT (9 mo or 12mo)
David Hanna	Professor	1	27	Tenured	9
Suzanne Miller	Professor	0.5	12	Tenured	9
Kelly Seitter	Professor	1	20	Tenured	9
Ferrell Clark	Associate Professor	1	10	Tenured	9
Robert Eastley	Associate Professor	0.25	36	Tenured	9
Dan Pratt	Associate Professor	1	9	Tenured	9
Lee Templin	Associate Professor	1	22	Tenured	9
Brian Bejcek	Assistant Professor	1	0.5	Pursuing	9
Mark Dyke	Assistant Professor	1	1.5	Pursuing	9
Jen Miller	Assistant Professor	1	1	Pursuing	9
John Posillico	Assistant Professor	1	0	Pursuing	9

4.1.6 PROFESSIONAL DEVELOPMENT

4.1.6.1 PROFESSIONAL DEVELOPMENT OPPORTUNITIES

Faculty may pursue professional development opportunities they believe are applicable to courses they teach or are developing for the Program. The Dean's office has a fund for professional development, but limits faculty to 1 professional development opportunity each academic year. The amount awarded is a maximum of $1,500 for individual travel and $2,000 for activities that include a presentation leading to journal publication.

The Program faculty must vote on any professional development costs not covered by the Dean's office. Exceptions are covered by the Program's S&E budget and Development budget if available.

The college does not reimburse any costs associated with professional licensure.

4.1.6.2 CONSULTING WORK CONDUCTED BY FACULTY MEMBERS

Faculty are encouraged to complete consulting work outside of the University – it is recognized as being beneficial to the Program, College, and University. Faculty are limited to 10 days of leave per academic year to complete consulting activities without impacting faculty workload.

4.1.7 FACULTY EVALUATION

4.1.7.1 PROCESS FOR FACULTY EVALUATION

TENURE-TRACK FACULTY - FIRST AND SUBSEQUENT YEARS

- First year introduction to tenure process
- Yearly resume update
- Student Assessment of Instruction (SAI) for each course and section
- Candidate Observation by each member of the candidate's Tenure Review Committee
- Peer Reviews (completed by other tenured faculty within the Program)
- Tenure Review Committee's Annual Evaluations
- Candidate Professional Development Plan completed by candidate
- Annual Associate Dean Evaluation
- Dean's recommendation, Vice President of Academic Affairs recommendation

TENURE-TRACK REQUESTING YEAR

- Apply for tenure with a formal letter and portfolio with resume, classes taken, additional formal education, and other supporting material
- Program vote
- Dean's recommendation, Vice President of Academic Affairs recommendation

POST TENURE REVIEW

- Portfolio with curricula vitae, examples of work, SAIs for selected course sections

4.1.7.2 FERRIS STATE UNIVERSITY'S FACULTY EVALUATION CYCLE

Tenure-track faculty are evaluated each year for contract renewal. Tenure-track faculty must achieve tenure within 4-6 years.

Once a faculty member has attained tenure, they are evaluated every 5 years.

SECTION 5

STUDENT POLICIES

5.1 REQUIREMENTS

5.1.1 ACADEMIC POLICIES

5.1.1.1 WRITTEN POLICIES WITH REQUIRED COURSES AND ACCEPTABLE ELECTIVES

The Program's required courses and electives are indicated on the Program check sheets that are available through the Program's webpage as well as within each student's MyFSU account. See Appendix K for the 4 different check sheets for the Program:

- AAS in Building Construction Technology
- AAS in Civil Engineering Technology – Highway Emphasis
- BS Construction Management
- BS in Construction Management for AAS Architectural Technology transfer students

The check sheets clearly explain the required courses, required course prerequisites, and the entry requirements to get into the Bachelor of Science in Construction Management degree classes. They also reference the General Education requirements for all of the degrees.

5.1.1.2 POLICY DEVELOPMENT

University General Education requirements are developed by a university committee which has one representative from each college. Suzanne Miller has been serving as the College of Engineering Technology representative on the General Education Committee since 2010.

The curriculum itself was developed with input from faculty, the Industry Advisory Board, ACCE requirements, comments made to faculty by students, and formal student feedback in sessions with the Industry Advisory Board and also in the senior surveys.

5.1.2 TEACHING QUALITY

5.1.2.1 TEACHING QUALITY ASSURANCE

The hiring qualifications for tenure-track or adjunct faculty to teach in the Program are the same. Specific degrees and industry experience required for individual courses are listed in Appendix I referenced in Section 4.1.1.1.

5.1.2.2 SYSTEMATIC ASSESSMENT MECHANISM

There are two methods for assessing the quality of teaching within the Program. The first is Student Assessment of Instruction (SAI). SAIs are required of all courses taught by non-tenured faculty. Per the Ferris Faculty Association's contract with the university, tenured faculty select only 2 of their taught sections for SAIs. This does allow some courses to not be evaluated by students.

The second method is peer review of tenure-track faculty by tenured faculty. This is required to be completed each Fall and Spring semester by members of a faculty's tenure committee (comprised of 2 tenured Program faculty and 1 tenured faculty member from another program). All Program faculty are encouraged to complete a classroom observation of non-tenured faculty once a year. The college's Associate Dean also completes a classroom observation each semester.

Tenured faculty must complete a Post-Tenure Review every 5 years which does evaluate SAIs, professional development, consulting, other university service, and community service.

Please see Appendix L for the Tenure Track Faculty Candidate Observation Form.

5.1.3 ADMISSIONS AND ENROLLMENT

5.1.3.1 ADMISSIONS PROCESS

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).

5.1.3.2 ADMISSIONS PROCESS AS COMPARED TO UNIVERSITY POLICIES

Ferris State University is an opportunity school. While we embrace that philosophy, our math requirements are more stringent than those for general admission to the university. Students that have shown an early interest in construction (especially through attendance at a career tech center) typically perform very well in the program and industry. Enjoyment of construction-related classes appears to encourage students to embrace in their General Education courses.

Internal and external transfers must have a cumulative GPA of 2.0 or higher and be ready for MATH 120 (Trigonometry). Transfers that are not ready for this level of math, are admitted with a "pre" designator until they are "math-ready". It allows the Program to carefully advise them regarding general education courses and sequencing.

5.1.4 RECRUITMENT AND COMPOSITION

5.1.4.1 PROGRAM'S ASPIRATIONS REGARDING STUDENT COMPOSITION

The Program's aspirations for student composition include a student body between 270 and 300 with an increased presence of females and minorities and a solid math background. The Program supports increasing enrollment by several means. The Program has hosted a Transportation Camp for the past six summers that is partially funded by the Michigan Department of Transportation and the Federal Highway Administration. The camp focuses on recruiting females and minorities.

The Program attends Michigan Construction Career Days every May which is an opportunity for 7th – 12th grade students to explore construction as a career.

The Program also attends the annual meeting of the Michigan Construction Teachers Association to meet building trades instructors from around the state. We schedule visits of their schools to FSU or visits by the Program Coordinator to their schools for recruiting. The Program typically hosts approximately 7-8 visits from high schools each academic year.

The Program Coordinator and School Director serve on the Advisory Boards for several high school career tech centers which keeps the Program visible.

Each semester the Program Coordinator presents the Construction Technology & Management Program options to FSU's CARE 102 class (a career exploration class for undecided students). We have procured several students from these classes over the past three years.

Any opportunity that is presented to the Program by FSU Admissions is utilized. Thursdays are dedicated as Program information days tied in to regular Admissions tours which allow prospective students to meet with a Program representative. Admissions hosts Dawg Days on 6-7 Saturdays a year and the Program always has a representative available to meet with prospective students.

The Program Coordinator travels around the state to recruit from high schools. She has made several presentations to high school counselors to help them understand the career opportunities in the construction industry and why FSU is a great place to learn it. She has also accepted any invitations to speak to students in the Detroit schools as those students are primarily minorities.

As a female, the Program Coordinator accepts any invitation to speak about non-traditional career opportunities for females, specifically in construction.

The Program Coordinator also participates in "TEA" events (Teaching Engineering Aptitude) sponsored by the College. These events are typically for middle school female students to introduce them to different engineering careers and the Coordinator typically directs the Career Carousel activity and always promotes construction.

The College of Engineering Technology has an embedded career specialist dedicated to recruiting and retaining females into the college. Several female faculty in the Program have participated in events sponsored by the career specialist to encourage female participation.

In its most recent curriculum revision, the Program changed the entry level math requirement for the Program. Our entry level math was College Algebra and we raised it to Trigonometry. Entry to the 300/400 level CONM course still requires a 2.5 GPA overall to ensure student quality and improves the potential of student success in the Bachelor degree.

5.1.4.2 HOW THE PROGRAM'S RECRUITMENT IS DIRECTED

The Program welcomes and recruits all students. Specifically, career tech centers with building trades programs have provided almost 50% of our students. The instructors at the career tech centers will often encourage their students with an aptitude for leadership and academics to consider attending college and specifically FSU.

The Program's students are also strong ambassadors for the Program, working in the community, helping in elementary schools, speaking engagements at their high schools, etc.

5.1.4.3 PROGRAM'S RECRUITMENT AND PUBLICITY COMPARED TO OTHER UNIVERSITY PROGRAMS

The Program recruits more than most programs in the College and is one of the busiest in terms of recruitment compared to the rest of the University. Whenever requests are made to help staff tables at recruiting events, the Program volunteers. The Program travels to events around the state to keep our presence known.

The Program worked with the Television & Digital Media Program in 2016 to have a series of videos made highlighting the program. They included a focus on student athletes in the program, females in the program, why choose construction management from a student perspective, and why construction management from an industry perspective. These will be highlighted on the Program's webpage which is to be updated this summer.

Last year the Program offered posters advertising the Program to the career tech centers to display. Whenever the University requests examples of student internships or successful graduates from throughout the University community, the Program always offers a CTMG student or graduate for consideration – more so than any other program.

The Program is also host and home to the Michigan Construction Hall of Fame. Each fall, approximately 200 industry members and their families attend an induction ceremony to welcome 3-4 new industry inductees into the Hall on the Big Rapids campus. It is heavily promoted among the industry associations including the Associated Builders and Contractors of Michigan (ABC), Associated General Contractors of Michigan (AGC) Construction Association of Michigan (CAM), Home Builders Association of Michigan (HBAM), and Michigan Infrastructure and Transportation Association (MITA).

5.1.5 ACADEMIC ADVISING AND MENTORING

5.1.5.1 ACADEMIC ADVISING PROCESS

Each student in the Program is assigned an Advisor. The Advisor is a faculty member who is obviously well-versed in the Program and its requirements. Each semester a student must meet with their Advisor to review the classes for which they should register in the next semester. They cannot register for classes until they have an Advising Hold removed by their Advisor.

Students also have the option to meet with the Program Coordinator for any advising-type questions.

The Dean's office has a Director of Student Services. She also works with students on academic progress and graduation, among many other responsibilities. Students that find themselves on final academic probation typically have to meet with the Director and the Program Coordinator on a regular basis to track academic progress and get themselves back on track.

The College has a standard syllabus attachment that is issued with every course. It lists advising and counseling options and contacts for students.

5.1.5.2 PLACEMENT SERVICES AND OPPORTUNITIES

MyFSU student portal offers a plethora of information relating to Academic Support and Advising Appointment Scheduling, and Handshake (the University program for job placement). They also receive regular emails from the Center for Leadership and Career Services (CLACS) with different opportunities for career help.

The Program also emails opportunities to students as they are received at the office directly from industry.

5.1.6 COURSE SCHEDULING

5.1.6.1 COURSE OFFERING FORMATS AND TIMES

Courses for the Program are scheduled in blocks per the Program checksheets and also to accommodate required General Education offerings.

All BCTM and CONM prefix courses are offered both Fall and Spring semesters to accommodate transfers and students that change programs in the middle of the academic year. The CETM classes have lower enrollment and thus are only offered once a year.

Course Number	Course Title (abbreviated)	Primary Semester	Fall 2017		Spring 2018		Average Enrollment
			# Enrolled	# sections /labs	# Enrolled	# sections /labs	
CONM 100	Orientation to CM	Fall	41	2	-	-	41
CONM 111	Construction Practices	Spring	22	2	52	4	37
CONM 112	Plans and Specifications	Spring	20	1	49	2	35
CONM 116	Construction Graphics	Fall	67	4	19	1	43
CONM 117	Building Information Tech	Spring	30	2	48	3	39
CONM 121	Materials Properties and Testing	Fall	73	5	31	2	52
CONM 122	Surveying	Fall	60	4	28	2	44
CONM 211	Estimating I	Fall	52	4	32	2	42
CONM 212	Soils and Foundations	Spring	32	2	46	3	39
CONM 221	Statics and Structures	Spring	25	1	34	2	30
CONM 222	Administration	Spring	13	1	48	3	31
CONM 225*	Field Engineering	Fall					
CONM 311	Formwork and Temp Structures	Fall	39	2	22	1	31
CONM 312	Scheduing	Fall	37	3	18	2	28
CONM 321	Estimating II	Spring	23	1	33	2	28
CONM 324	Advanced Technology	Spring	17	1	38	3	28
CONM 373**	Ethics and Professionalism	Spring					
CONM 412	Contracts	Spring	23	1	27	1	25
CONM 413	Economics	Fall	24	1	27	1	26
CONM 424	Safety	Fall	23	1	26	1	25
CONM 423/430	Professional Methods	Fall	22	1	25	1	24
CONM 499	Project Management	Spring	15	1	35	2	25
BCTM 213	Framing	Spring	36	2	16	1	26
BCTM 223***	Mech/Elec Plans and Specs	Spring	46	3	20	1	33
BCTM 225***	Field Engineering	Fall	13	1	32	2	23
BCTM 235****	Mechanical Practices	Fall					
BCTM 234****	Electrical Practices	Spring					
BCTM 217****	VDC	Spring					
CETM 214	Advanced Materials	Fall	22	2			22
CETM 215	Equipment & Operations	Fall	18	1			18
CETM 226	Highway Technology	Spring			20	2	20
CETM 327*****		Spring			18	1	18

*CONM 225 will be new in Fall 2018

**CONM 373 will be offered effective Fall 2019

***BCTM 223 and 225 will no longer be offered in Fall 2018 with new curriculum

****BCTM 217, 234, and 235 are new curriculum courses that will be offered effective Fall 2018

***** CETM 327 is changed to CETM 227 effective Fall 2018

5.1.7 STUDENT PLACEMENT

5.1.7.1 STUDENT PLACEMENT SERVICES

Ferris State University has a Center for Leadership, Activities, and Career Services (CLACS) to provide assistance to students with career development. They can assist with career planning, skills development, self-marketing, job performance, and employment opportunities.

There are 2 career fairs held each year – one in fall and one in spring. Resume and interviewing workshops are offered before each fair.

CLACS uses "handshake" for employers to post job opportunities for current students and graduates.

The Program also helps with student placement in multiple ways. The Program receives multiple job postings throughout the year from employers that are emailed out to students, announced in classes, and posted around the Granger Center. Employers have the opportunity to make evening presentations throughout the semester to students.

An evening with contractors is typically hosted by the Program the night before the Career Fairs – typically 6-8 contractors have 20 minutes to present basic information about their company to students to entice them to visit their booths at the Career Fair.

The Program has an identified faculty member who is closely tied to industry. He maintains a program presence at many industry association meetings and serves on the Education Committee for the AGC. When a student is seeking employment in a particular sector of the industry or a particular location, this faculty member typically has an industry contact to help the student. This relationship with contractors also works for the Program in reverse in that contractors will call this faculty member when they wish to employ student.

5.1.7.2 JOB TITLES AND CONSTRUCTION SECTOR FOR ALL GRADUATES IN 2017-2018

The Senior Survey is issued in early April. In 2018, we had a class graduating from the Grand Rapids campus as well as our usual fall and spring graduations, so the numbers are larger than typical (15 students completed the Grand Rapids cohort this May). From that survey:

- 65 total students
- 13 of the 15 Grand Rapids students were remaining with their current employers (this cohort is intended for non-traditional students working during the day)
- 8 students were continuing to graduate school with 5 pursuing MBA's
- All others had accepted jobs in the following sectors:
    - 25 Construction Management
    - 22 General Contractors
    - 23 Construction Management and General Contracting
    - 7 Specialty subcontractors
    - 6 Civil
    - 1 Residential
    - 1 Land Development

- Job titles:
    - Project Engineer
    - Assistant Superintendent

5.1.8 EXTRACURRICULAR ACTIVITIES

5.1.8.1 EXTRACURRICULAR ENCOURAGEMENT

In the fall semester, all incoming freshmen to the Program are required to take CONM 100 Orientation to Construction Management. This course is based on a required freshmen seminar course and gives the Program the opportunity to include Program-specific information for the students. Student representatives from our two student groups make presentations to the freshmen about the Program's student organizations, Associated Construction Students and Sigma Lambda Chi.

The Program also hosts a "Welcome Lunch" for all incoming freshmen and transfer students to introduce students to the same 2 organizations so they hear about the student organizations again as well as student competitions. Associated Construction Students also posts information promoting their "Welcome Picnic" throughout the building.

The College of Engineering Technology hosts a college-wide picnic and student groups staff booths for students to learn about the different Registered Student Organization groups.

Ferris-wide, Bulldog Bonanza in the fall introduces students to community services (such as the hospital, non-profits, and local businesses) as well as the registered student organizations. Meijer Madness introduces students to some Registered Student Organizations and again some community organizations.

Founders Day introduces students to connected individuals in the community and tables are typically staffed by student groups. FSU also has a volunteer-supported United Way Center to connect students to the community.

Co-curricular transcripts are easily available to students for extracurricular tracking purposes. A co-curricular transcript is a record of outside-of-the-classroom accomplishments and involvements in registered student organizations, professional or education programs, awards, and community service. It recognizes activities in which students partake outside of the classroom.

Students that visit with the program prior to enrollment also hear about the Program's student group opportunities.

5.1.8.2 INDUSTRY-BASED PROFESSIONAL AND TRADE ORGANIZATIONS

The Program's student group that is available to all construction students is **Associated Construction Students**. It provides an umbrella organization for student chapters of various construction related professional organizations – Associated General Contractors (AGC), Associated Building Contractors (ABC), National Association of Home Builders (NAHB), Michigan Infrastructure and Transportation Association (MITA), Construction Management Association of America (CMAA), Asphalt Paving Association of Michigan (APAM), and National Association of Minority Contractors (NAMC) .

Sigma Lambda Chi Omicron II chapter of the national honorary construction society with the top 20% of our upper level students initially eligible for membership.

5.1.8.3 EXTENT OF STUDENT PARTICIPATION

- **Associated Construction Students** has approximately 55 members. Students typically attend SCAN (student contractor awareness night) for industry contacts, the annual AGC meeting, the MITA annual meeting, the APAM annual meeting, and numerous field trips to industry partner jobsites.
- **Sigma Lambda Chi** has approximately 10 members. Activities include multiple community service projects and mentoring of younger construction students.

5.1.9 STUDENT FEEDBACK

5.1.9.1 HOW THE PROGRAM'S ASSESSMENT PROCESS USES FEEDBACK

The Program has 3 primary methods of procuring student feedback. The first is a student feedback session open to all juniors and seniors in the program held with the Industry Advisory Board (IAB) in October. This is a private one-hour session between the students and the IAB. The feedback is disseminated back to the faculty by the IAB in the IAB meeting held in the afternoon. Comments are noted in the meeting minutes and how issues are addressed are relayed to the IAB in the April IAB meeting.

The second method of procuring feedback is through the Senior Exit Survey (Appendix F in Volume II). This allows for feedback regarding the facilities, career placement, how well the program meets ACCE's 20 SLO's, and any topics they believe are missing from the program. This is reviewed yearly to determine any necessary changes.

The third method is having 2 recent graduates on our Industry Advisory Board. Their tenure is for 2 years so that we have a graduate who is one year out from the program and one that is recently graduated. Their feedback is requested at each IAB meeting in October and April/May. It too is noted in the IAB meeting minutes.

The final method for obtaining student feedback is indirect and occurs when students approach faculty, the Program Coordinator, the School Director, or even the Dean with concerns. If it is a concern with a specific faculty member, it must be addressed by the School Director and/or Dean level because it is an administrative function.

5.1.10 FINANCIAL AID AND SCHOLARSHIP

Financial Aid information is initially available to students on Ferris's main webpage. It breaks down the process into 5 easy steps. It is also covered in the Admissions letter students receive upon acceptance.

Students have access to financial aid and scholarship information through their student account, MyFSU. The system automatically does the following for all students:

- Update student account
- Notify students of when payments are due
- Notify students of when FAFSA's are able to be completed
- Notify students of university-wide scholarship deadlines

The Program notifies students of deadlines for Program-specific scholarships via email and posters throughout the building.

When the Program is notified of outside scholarship opportunities for students, it is emailed out to all students in the program, it is emailed to faculty to announce in classes, and it is posted throughout the Granger building.

SECTION 6

PHYSICAL RESOURCES

6.1 REQUIREMENTS

The Construction Technology and Management Program is housed in the Granger Center, a building dedicated to Construction and HVACR on the Big Rapids campus. However, the Program is also offered in Grand Rapids at the Applied Technology Center (ATC).

6.1.1. OFFICES, CLASSROOMS AND LABORATORY SPACES

6.1.1.1 CLASSROOMS – BIG RAPIDS

The following classrooms are dedicated to the Program at Ferris. The GRN 102 auditorium is primarily assigned to Construction. The other two programs in the School of Built Environment (SBE), HVACR and Architecture/Facilities Management, occasionally hold classes in this auditorium when time is available. Classroom details are listed below. All spaces are assigned by the Director of the SBE in conjunction with the Program Coordinator.

Bldg.	Room No.	Approx. Area	Capacity	Furnishings	Environmental Problems
GRN	102	1520	75	Auditorium seating with distance AV equipment	None
GRN	105	1190	32	Large (two person) tables and chairs	None
GRN	109	960	32	Large (two person) tables and chairs	None
GRN	130C	861	32	Large (two person) tables and chairs	None

6.1.1.1 CLASSROOMS – GRAND RAPIDS

The courses offered in Grand Rapids at the ATC are primarily upper level lecture courses. Lecture-based courses simply require a classroom with tables and chairs. They are assigned by the Ferris State University staff on the Grand Rapids campus in conjunction with Grand Rapids Community College. There are no classrooms specifically dedicated to the Program.

6.1.1.2 LABORATORIES – BIG RAPIDS

Lab-based courses require different types of spaces. Some are computer-based, some are material-based, and some take place outdoors. The building laboratories dedicated to the Program are listed below – all are housed in the Granger Center. They are not shared and spaces are assigned by the Director of the SBE in conjunction with the Program Coordinator.

Bldg.	Room No.	Approx. Area	Laboratory Name	Description	Courses
GRN	108	1732	Klett Family Materials Lab	Material Properties & Bituminous Lab	CONM 121 CETM 214
GRN	112	304	Storage Room	Holds equipment and materials used in Labs 108 & 114	CONM 121 CONM 212 CETM 214
GRN	114	1380	Soils/Hydrology Lab	Soils and Foundations course lab	CONM 212
GRN	130	4864	Practices & Framing lab	Work Staging Area	CONM 111 BCTM 213
GRN	130A	294	Storage	Equipment & Material Storage	CONM 111 BCTM 213
GRN	130B	126	Storage	Equipment Storage	CONM 111 BCTM 213
GRN	130D	1188	Aggregate Storage Room	Aggregate storage, Material Testing & Equipment.	BCTM 213 CETM 214 CONM 111 CONM 121 CONM 212
GRN	130E	60	Concrete Curing Room	Systems for Lab curing of concrete	CONM 111 CONM 121 CETM 214

Bldg.	Room No.	Approx. Area	Laboratory Name	Description	Courses
GRN	259	1512	Computer lab	18 Student Station Computer lab	CONM 116 CONM 117 CONM 211 CONM 312 CONM 324 BCTM 225 CETM 226
GRN	263	76	Storage	Secure storage supporting two computer labs	
GRN	265	200	Support Room	House printers, auxiliary equipment	
GRN	269	1512	Computer lab	18 Student Station Computer lab	CONM 116 CONM 117 CONM 211 CONM 312 CONM 324 BCTM 225 CETM 226

6.1.1.2. LABORATORIES – GRAND RAPIDS

As with the Big Rapids campus, some of the courses taught in Grand Rapids (CONM 211, 222, 312, 324) utilize computer labs. Three other hands-on laboratory classes are also offered. CONM 212 Soils & Foundations has lectures at the ATC while its laboratories have been held on Saturdays in Granger or at Materials Testing Consultants, a downtown Grand Rapids firm that has allowed Ferris use their lab facilities. The other two lab-based classes (CONM 122 and BCTM/CONM 225) have a surveying component, so all lab work is completed outdoors in Grand Rapids and Big Rapids, respectively. Computer labs in the ATC are also assigned by the Ferris State University staff based on availability, with no dedicated classrooms for the Program.

6.1.1.2 OFFICES

Faculty and staff offices are listed below.

Building	Room Number	Approximate Area (SF)	Occupant
Granger Center	208	120	John Posillico
Granger Center	210	120	Brian Bejcek
Granger Center	211	120	Kelly Seitter
Granger Center	212	120	Jen Miller
Granger Center	214	120	Ferrell Clark
Granger Center	216	120	Dan Pratt
Granger Center	217	120	Lee Templin
Granger Center	220	120	Mark Dyke
Granger Center	221	120	David Hanna
Granger Center	227	1344	Shari Wessels*
Granger Center	227A	290	Suzanne Miller
Granger Center	227B	290	Robert Eastley
* Administrative office shared by CTMG program and HVACR program			

6.1.2 LIBRARY RESOURCES

6.1.2.1 PROCUREMENT OF LIBRARY MATERIALS

Books, periodicals and other reference materials may be obtained in a number of ways. Some technical journals are kept in the Granger Center. Technical reference materials, such as Means books used for estimating, are purchased by students. Others are found on-line or in the Ferris library.

6.1.2.2 MATERIAL LOCATION

In the past, books were often put on reserve in the library for students to check out and use. With the availability of technical materials on the internet, use of the Ferris library has become limited. Plans and specs used throughout courses in the Program are provided by the Program through the honor society, Sigma Lambda Chi. A library employee, Fran Rosen, is the CET contact for students seeking specific materials.

Materials for use by classes are periodically made available in the computer labs by a faculty member and must be checked out by students with their student ID from the Lab Monitor (student) who is available Sunday – Thursday 6:00pm – 9:00 pm

6.1.2.3 COURSES USING THE LIBRARY

There are no courses that specifically require use of library materials. Students researching a topic such as ethics are free to search the library or on-line for information.

6.1.3 INFORMATION SYSTEMS AND TECHNOLOGICAL EQUIPMENT

6.1.3.1 AVAILABLE COMPUTERS AND SOFTWARE

High quality computers, computational equipment, and software are available to all CTMG students. Granger has two computer labs (Rooms 259 and 269) dedicated specifically to the Program.

Each computer lab has 18 work stations with a large work area to lay out drawings and any other required reference materials. Each computer is an engineering model capable of handling high definition graphics and video as required with modeling in 3, 4, and 5 dimensions. Each workstation also has dual monitors and a networked mainframe with Internet access.

Each room has one networked faculty workstation at the “front” with a connected LCD projector. There is also a community laser printer that is free to Program students. The campus has free wifi.

Computer labs are open during the day primarily for class use. After 5:00pm they are available for student use. They are also available to students on the weekends. Program students have keycard access to the Granger Center and both Computer Labs.

There are an additional 13 computers in the Atrium space of the building which have the same software loaded as those in the computer labs. These computers are open to all students as they are in a public space of the building. Most software used in the Program is available to students for free.

All Program faculty have individual networked laptop computers in their offices. Those teaching specific computer classes (CONM 117, 324) or those integrating computer technology into their courses (CONM 116, 211,222, 225, 312, 499, CETM 226) utilize computers extensively. Students use computer technology in all of the above courses, as well as using word processing, spreadsheets and other construction industry specific software in a number of courses.

6.1.3.2 ALTERNATE METHOD COURSE DELIVERY

No courses are taught by alternative methods, so additional technical support is not required.

SECTION 7

FINANCIAL RESOURCES

7.1 REQUIREMENTS

7.1.1 BUDGETED FUNDS

7.1.1.1 AMOUNT AND PERCENTAGE OF OPERATING REVENUE AND EXPENDITURES – EDUCATIONAL UNIT

The Program's revenues and expenses are being compared to the HVACR Program's revenues and expenses because the salary totals are comparable, as are the average starting salaries of our graduates. The academic fiscal year of 2017 runs July 1, 2016 – June 30, 2017.

The difference between our two programs is the size – our Program's present enrollment is 274 students, while theirs is 177 students. Further, the HVACR Program has a $6 million endowment used to fund scholarships, materials, and faculty travel.

As noted on the next page, salaries account for almost 50% of the revenue and 58% of the expenditures.

Construction Technology & Management Program 2017 Fiscal Year Budget		
REVENUE SOURCE	**REVENUE AMOUNT $**	**% of TOTAL**
Institutional Funds		
Salaries	$648,527.76	49.82%
Academic Support	$118,052.65	9.07%
Benefits	$352,311.57	27.07%
Part-time	$2,542.50	0.20%
9 month non-faculty assignment	$8,641.69	0.66%
Supplemental Budget	$56,580.06	4.35%
Sick Leave Pay Off	$23,162.80	1.78%
S&E Operating	$74,293.20	5.71%
Other (Transfers into program)	$15,411.88	1.18%
Internal Income	$2,160.00	0.17%
TOTAL REVENUE	$1,301,684.11	100.00%
EXPENDITURE TYPE	**EXPENDITURE AMOUNT $**	**% of Total**
Salaries		
Faculty	$648,527.76	57.94%
Staff	$39,168.36	3.50%
Student Wages	$5,125.58	0.46%
Fed Work Study	$29.84	0.00%
Benefits	$352,311.57	31.47%
Subtotal Salaries	$1,045,163.11	93.37%
		%
Operating	$12,746.23	1.14%
Supplies	$24,627.64	2.20%
Educational Materials		
Telephone/Internet	$5,380.11	0.48%
Equipment	$1,461.85	0.13%
Travel	$28,801.61	2.57%
Other Expenses (M&R)	$1,193.73	0.11%
Subtotal Operating	$74,211.17	6.63%
Carryover to FY 18	-$82.03	-0.01%
TOTAL EXPENDITURES	$1,119,374.28	100.00%

As compared to the HVACR Program:

	CTMG 2017 Fiscal Year Budget		HVACR Program 2017 Fiscal Year Budget	
REVENUE SOURCE	**REVENUE AMOUNT $**	**% of TOTAL**	**REVENUE AMOUNT $**	**% of TOTAL**
Institutional Funds				
Salaries	$648,527.76	49.82%	$675,321.49	46.37%
Academic Support	$118,052.65	9.07%	$40,466.51	2.78%
Benefits	$352,311.57	27.07%	$361,887.40	24.85%
Part-time	$2,542.50	0.20%		
9 month non-faculty assignment	$8,641.69	0.66%	$8,641.69	0.59%
Supplemental Budget	$56,580.06	4.35%	$71,399.95	4.90%
Sick Leave Pay Off	$23,162.80	1.78%	$93,006.07	6.39%
S&E Operating	$74,293.20	5.71%	$128,946.49	8.85%
Other (Transfers into program)	$15,411.88	1.18%	$75,800.00	5.20%
Internal Income	$2,160.00	0.17%	$959.41	0.07%
TOTAL REVENUE	$1,301,684.11	100.00%	$1,456,429.01	100.00%
EXPENDITURE TYPE	**EXPENDITURE AMOUNT $**	**% of Total**	**EXPENDITURE AMOUNT $**	**% of Total**
Salaries				
Faculty	$648,527.76	57.94%	$675,321.49	55.93%
Staff	$39,168.36	3.50%	$39,168.36	3.24%
Student Wages	$5,125.58	0.46%	$2,434.23	0.20%
Fed Work Study	$29.84	0.00%		
Benefits	$352,311.57	31.47%	$361,887.40	29.97%
Subtotal Salaries	$1,045,163.11	93.37%	$1,078,811.48	89.34%
Operating	$12,746.23	1.14%	$19,552.24	1.62%
Supplies	$24,627.64	2.20%	$66,477.20	5.51%
Educational Materials		0.00%		0.00%
Telephone/Internet	$5,380.11	0.48%	$5,956.40	0.49%
Equipment	$1,461.85	0.13%	$1,332.50	0.11%
Travel	$28,801.61	2.57%	$34,390.77	2.85%
Other Expenses (M&R)	$1,193.73	0.11%	$959.00	0.08%
Subtotal Operating	$74,211.17	6.63%	$128,668.11	10.66%
Carryover to FY 18	-$82.03	-0.01%	-$288.66	-0.02%
TOTAL EXPENDITURES	$1,119,374.28	100.00%	$1,207,479.59	100.00%

As compared to the Manufacturing Program because their number of students is almost equal to ours as is their number of faculty lines.

2017 Fiscal Year Budget	**Construction Technology & Management**		**Manufacturing Engineering**	
REVENUE SOURCE	**REVENUE AMOUNT $**	**% of TOTAL**	**REVENUE AMOUNT $**	**% of TOTAL**
Institutional Funds				
Salaries	$648,527.76	49.82%	$503,692.00	56.43%
Academic Support	$118,052.65	9.07%	$42,301.59	4.74%
Benefits	$352,311.57	27.07%	$258,778.30	28.99%
Part-time	$2,542.50	0.20%	0	0.00%
9 month non-instructional assignment	$8,641.69	0.66%	$15,454.19	1.73%
Supplemental Budget	$56,580.06	4.35%	$28,687.51	3.21%
Sick Leave Pay Off	$23,162.80	1.78%		0.00%
S&E Operating	$74,293.20	5.71%	$34,780.75	3.90%
Other (Transfers into program)	$15,411.88	1.18%	$1,250.00	0.14%
Internal Income	$2,160.00	0.17%	$7,704.00	0.86%
TOTAL REVENUE	$1,301,684.11	100.00%	$892,648.34	100.00%
EXPENDITURE TYPE	**EXPENDITURE AMOUNT $**	**% of Total**	**EXPENDITURE AMOUNT $**	**% of Total**
Salaries				
Faculty	$648,527.76	57.94%	$503,692.00	65.62%
Staff	$39,168.36	3.50%	$0.00	0.00%
Student Wages	$5,125.58	0.46%	$329.66	0.04%
Fed Work Study	$29.84	0.00%	0	0.00%
Benefits	$352,311.57	31.47%	$258,778.30	33.71%
Subtotal Salaries	$1,045,163.11	93.37%	$762,799.96	100.00%
Operating	$12,746.23	1.14%	$11,646.87	1.52%
Supplies	$24,627.64	2.20%	$8,869.46	1.16%
Educational Materials		0.00%	$2,911.21	0.38%
Telephone/Internet	$5,380.11	0.48%	$3,464.64	0.45%
Equipment	$1,461.85	0.13%	$0.00	0.00%
Travel	$28,801.61	2.57%	$6,693.92	0.87%
Other Expenses (M&R)	$1,193.73	0.11%	$1,194.65	0.16%
Subtotal Operating	$74,211.17	6.63%	$34,780.75	4.53%
Carryover to FY 18	$82.03	0.01%	$4,761.97	0.62%
TOTAL EXPENDITURES	$1,119,374.28	100.00%	$767,561.93	100.00%

7.1.1.2 AMOUNT AND PERCENTAGE OF OPERATING REVENUE AND EXPENDITURES – DEGREE PROGRAM

The degree program is part of the construction educational unit. See section above for information.

7.1.1.3 PROJECTED RESOURCES

The amount of financial institutional support for the Program has gradually diminished over the past several years. Adequate Supply and Expense (S&E) funding is critical to provide a quality education to students. The Program's S&E budget peaked in 2010-11 when enrollment was very similar to present day. However, institutional funding of the Program dropped almost 45% over that timeframe. The allocated S&E funds during that time are shown below, along with actual S&E dollars spent by the Program.

To help put it in perspective, please see the table below for the Academic Year, University S&E allocation, expenditures, Program enrollment, and Number of Faculty.

Academic Year	S&E Allocation	Expenditures	Enrollment	Number of Faculty (full-time equivalent)
2010 – 2011	$75,130.00	$95,114.00	289	11
2011 – 2012	$67,332.00	$93,228.00	253	11
2012 – 2013	$57,128.00	$83,426.00	220	11
2013 – 2014	$49,406.00	$64,983.00	223	10
2014 – 2015	$49,406.00	$77,056.00	220	8
2015 – 2016	$49,406.00	$74,907.00	249	7.75
2016 – 2017	$49,000.00	$74,293.00	260	7.25
2017 - 2018	$41,500.00	-	270	8.75

Recognizing the major reduction in funding, the Program has reduced faculty travel and development. We rely upon one-time donations to help with student competition expenses and have reduced copy costs as much as possible. We have nearly depleted our non-recurring development fund. Faculty make every effort to fund trips they make toward professional development with a grant from the Dean's office or an outside source. In the past year, the largest amount any faculty member could receive was reduced to $2,000 for activities that include giving a presentation that leads to journal publication and $1,500 for individual activities.

The Program cannot sustain its expenses with the above referenced budget numbers. Thus, the Program has undertaken a campaign to raise $1 million for an endowment (the "Construction Management Experiential Technical Learning Endowment"). It will be used to fund materials, tools, equipment, software, technology, field trip travel, student competitions, development of experiential learning opportunities, professional development for students, and the like. The endowment campaign began in spring 2018.

7.1.2 NONRECURRING FUNDS

7.1.2.1 SOURCE, AMOUNT USE OF NONRECURRING FUNDS

Source	Amount Available	Use
Development	$14,125.19	Program support
CTMG Golf Outing (replenished yearly with golf outing)	$7,934.14	Scholarships
Klett Materials Fund (diminishing fund)	$4,286.57	Support GRN 108 Materials Lab – specifically equipment
Whiting Turner Endowment	$65,582.44	Fund activities of the Program related to use of the Auditorium
Student Competition Endowment (available funds were used to cover costs this year 2017-2018)	$0.00	Student travel and costs associated with student competition participation (ASC, Region 3, ABC)
Construction Management Experiential Technical Learning Endowment (campaign has just started this year – 2018)	$0.00	Materials, tools, equipment, software, technology, field trip travel, student competitions, development of experiential learning opportunities, professional development for students

7.1.2.2 HOW NON-RECURRING FUNDS HAVE BEEN USED IN THE PAST 3 YEARS

The Program has been using non-recurring funds for the past 3 years to make up for the S&E budget shortfall.

SECTION 8

INDUSTRY, ALUMNI, AND PUBLIC RELATIONS

8.1 REQUIREMENTS

8.1.1 SUPPORT FROM INDUSTRY

8.1.1.1 EVIDENCE THE INDUSTRY ADVISORY BOARD IS REPRESENTATIVE OF POTENTIAL EMPLOYERS OF GRADUATES OF THE DEGREE

IAB membership presently consists of representatives from companies that regularly recruit our students for summer internships and full-time (both immediately upon graduation and beyond), industry association representatives, and two retirees from the industry who has served as an Industry Representative on ACCE visiting teams for the past three years.

MEMBER COMPANIES	MEMBER ASSOCIATIONS	OTHER
Brinker Group • Regional CM • Minority/MBE • Development • Commercial	Asphalt Paving Association of Michigan	Owner's Representative
Elzinga & Volkers • Regional CM (West Michigan) • Commercial	Grand Rapids Builders Exchange • Gender diversity	Retired • Owner, National CM
Erhardt Construction • Regional CM (Grand Rapids) • Commercial		Retired • International Engineering and Construction Services
Kiewit • Large, International GC/CM • Heavy Civil and Industrial		
Klett Construction Company, Inc. • Trade Contractor • Heavy Civil		
McCarthy • Large, National GC/CM • Commercial and Industrial • Gender diversity		

MEMBER COMPANIES	MEMBER ASSOCIATIONS	OTHER
Pioneer Construction • Regional CM (West Michigan) • Commercial		
Rockford Construction • National CM • Commercial		
Whiting Turner • National GC/CM • Commercial		

A representative from AMI (a specialty trade subcontractor in West Michigan) was elected to the IAB at the spring meeting. We anticipate Barton Malow joining the Industry Advisory Board in the fall semester - a national GC/CM presence headquartered in southeast Michigan.

8.1.1.2 EVIDENCE THE INDUSTRY ADVISORY BOARD (IAB) MEETS AT LEAST ONCE A YEAR

The Program's IAB meets twice a year – once in the fall and once in the spring. The meetings are planned to coincide with other activities to enhance the experience. The fall meeting occurs in late October on the same day as the induction ceremony for the Michigan Construction Hall of Fame which is housed at Ferris State University. This allows the IAB members to attend the meeting all day and the ceremony in the evening (all are invited to attend).

The spring meeting coincides with the Program's Golf Outing. It allows the IAB members that are from out of town to attend both events.

The IAB has an Executive Committee and 4 Subcommittees. They meet as needed throughout the year.

8.1.1.3 MINUTES OF EACH INDUSTRY ADVISORY BOARD MEETING

See Appendix M for the meeting minutes for Fall 2017 and Spring 2018. Additional meeting minutes are available upon request.

The meeting minute packets always include the following:

- Meeting minutes
- Program dashboard
- IAB Membership diagram
- IAB Subcommittee membership

- Any attachments (such as course outlines, surveys, etc)

Meeting preparation documents are forwarded to IAB members 1 week before the meeting to assure content understanding and meeting time efficiency.

8.1.2 SUPPORT FOR INDUSTRY

The faculty participate in different activities with various constituencies the Program serves.

- Suzanne Miller and Robert Eastley serve on various high school and community college advisory boards.
- Kelly Seitter maintains a relationship with MITA and APAM, bringing students to their annual meetings to volunteer their time to help the association with registration and other activities.
- Lee Templin maintains a strong relationship with CAM and AGC Michigan through attendance at their meetings. He also brings students to their sponsored Student-Contractor Awareness (SCAN) Night, estimating competitions, and other meetings. He was active on the Education Committee for the national AGC until 2015.
- Lee Templin was an educational consultant for the Ironworkers Management Progressive Action Cooperative Trust and developed an online course for them that he presented in 2011.
- Lee Templin presents classes in the AGC Supervisory Training Program.
- The Program has hosted a Transportation Camp partially funded by the Michigan Department of Transportation and the Federal Highway Association.
- Ferrell Clark served as the Education Director for ABC West Michigan for several years.
- Both Lee Templin and David Hanna consult for the construction industry on a regular basis.
  - Lee's courses are typically related to scheduling.
  - David's courses are presented to the American Society of Civil Engineers for Continuing Education credit in the following areas: hydraulic design, pipeline design, pump station design, water and wastewater treatment plant design, hydrology, storm sewer design, drainage design, engineering ethics, and construction cost estimating.
- Lee Templin and Suzanne Miller represent the Program on the Michigan Construction Hall of Fame Selection Committee. The Selection Committee is made up of representatives from: Homebuilders Association of Michigan, Michigan Infrastructure and Transportation Association, Construction Association of Michigan, Associated General Contractors of Michigan, and Associated Builders and Contractors.
- The Program has an industry education extension – the Institute of Construction Education and Training – that keeps Ferris in front of the civil industry throughout Michigan. Its Director is a former faculty member, Tom Larabel. It offers technician training programs in cooperation with the Michigan Department of Transportation including:
    - Certified Aggregate Technician Level One and Level Two
    - Certified Hot Mix Asphalt Lab Technician Level One

- Certified Hot Mix Asphalt Paving Operations Technician
- Certified Hot Mix Asphalt QC/QA Technician
- Certified Density Control Technician
- Underground Pipe Installation and Inspection
- HMA Sampling for Local Agency Projects

Faculty have the opportunity to offer classes to industry through ICET as well. In the past we have offered OSHA 30 Hour training and some scheduling classes

8.1.3 STUDENT-INDUSTRY RELATIONS

8.1.3.1 DEMONSTRATE THE PROGRAM ACTIVITELY ENCOURAGES AND FACILITATES PARTICIPATION OF STUDENTS IN CONSTRUCTION-RELATED ORGANIZATIONS AND INTERNSHIPS

The Program does not require internships as part of their graduation requirements. However, summer internships are highly encouraged. The Program actively promotes job opportunities by posting them around the building, announcing them in classes, and through student emailing. Faculty strongly encourage all students (seniors through freshman) to attend the fall and spring career fairs and offer advice with their resumes and interviewing.

As noted previously, the student organization, Associated Construction Students (ACS), is promoted by the student group itself with multiple presentations, a welcome picnic, and postings throughout the Granger building. The faculty promote this organization during the Program's welcome picnic, by inviting the group's executive board to present in their classes and in the classroom.

The Program provides student volunteers for many industry organizations as they require assistance at association meetings or events. Students serve as counselors for the summer Transportation Camp.

The Program is regularly contacted by members of the Big Rapids community for construction-related help. It varies from building ramps, stairs, decks, roofs, baseball dugouts, to a youth center for Mecosta County. The student group, ACS, works with Mecosta's Habitat for Humanity to coordinate student volunteers.

Students are highly encouraged to participate in student competitions sponsored by ABC and ASPE.

The Program began a unique offering in the Spring 2018 semester which it intends to continue every year. "Industry Speaks" was created to give students the opportunity to attend multiple sessions presented by industry experts in a number of areas identified by students in previous feedback sessions and senior surveys as requiring more emphasis – QA/QC, conceptual estimating, scheduling (LEAN), and new technology in the industry. Whiting Turner supplied all 7 presenters who offered 4 sessions simultaneously to give all students the opportunity to attend at least one session. It was initially offered to juniors and seniors as the topics trended toward higher level construction management topics, but was ultimately opened up to all students.

8.1.3.2 DEMONSTRATE ALL STUDENTS HAVE ACCESS TO INFORMATION ABOUT INTERNSHIPS AND ACTIVITIES OF CONSTRUCTION-RELATED ORGANIZATIONS IN THEIR AREA

- Career fair information is emailed to all students from the Center for Leadership and Career Services.
- “Handshake” is available for all students to learn about job opportunities.
- Job postings are placed throughout the Granger building in many locations.
- Announcements are made in class for job and community service opportunities.
- Evening presentations are available to all students to learn about job opportunities for the commercial industry as well as faith-based organizations
- Grand Rapids students have access to the same opportunities, except for the posters around the Granger building which are duplications of class announcements and emails

8.1.4 ALUMNI RELATIONS AND FEEDBACK

8.1.4.1 DEMONSTRATE THE PROGRAM MAINTAINS A CURRENT REGISTRY OF ALUMNI AND CONTACT WITH THEM

Ferris State University maintains a database of graduates (based on their responses to the university’s graduation survey) to be able to contact for donation purposes. The Program does have access to this database. Lee Templin also maintains a database of graduates and communicates with several of them on a regular basis.

The Industry Advisory Board maintains 2 positions on the Board for recent graduates of the Program. This has engaged more graduates who are excited to share their opinions regarding their educational experience.

8.1.4.2 DEMONSTRATE THE PROGRAM ENGAGES ALUMNI IN ACTIVITIES

The Industry Advisory Board is 50% alumni and we regularly have requests from alumni to join the IAB or help the Program in any other manner, such as critiquing the capstone course presentations, providing jobsite tours of their projects, serving on panels for student mentorship, and helping fund student competitions.

Many of the recruiters from different construction companies are Ferris alumni. We make sure we visit with them at the two career fairs held during the academic year.

The Program attends many industry functions, including association meetings, holiday gatherings, and golf outings to maintain relationships.

8.1.5 PUBLIC DISCLOSURES

8.1.5.1 DEMONSTRATE THE PROGRAM PUBLISHES PROGRAM OBJECTIVES, ADMISSION REQUIREMENTS, ASSESSMENT MEASURES, INFO FROM ASSESSMENT AND ACTIONS TAKEN, STUDENT ACHIEVEMENT; EMPLOYMENT TYPES AND RATES.

The Program's website is being updated this summer to ensure it complies with University and accessibility requirements. It will include all of the information required by ACCE that is expected to be available to the public. It should be completed by September 2018.

SECTION 9

ACADEMIC QUALITY PLANNING PROCESS AND OUTCOME ASSESSMENT

9.1 REQUIREMENTS

9.1.1 CONTINUOUS IMPROVEMENT

The Program spent 3 years evaluating the program and developing a new curriculum, 1 year moving the curriculum proposal through the university system for approval, and implemented its new curriculum in Fall 2017. Throughout that time period, most faculty were on overload. Until that time assessment fell on individual instructors reviewing their own classes in an informal manner. Now that the new curriculum is in place, we are beginning the new assessment process.

Clarification of Definitions used by the Program: All of our courses contain both Course Learning Outcomes and specific ACCE Student Learning Outcomes.

9.1.1.1 STRATEGIC PLAN FOR THE PROGRAM

See Appendix C for the Program's Strategic Plan

9.1.1.2 ASSESSMENT PLAN FOR THE PROGRAM

See Appendix C for the Program's Assessment Plan. Because it has only recently been developed, it is a work in progress. It will be evaluated in fall before the start of the semester. It includes both direct and indirect assessment measures.

9.1.1.3 ASSESSMENT IMPLEMENTATION PLAN FOR THE DEGREE PROGRAM

See Appendix C for the Program's Assessment Implementation Plan. The full implementation of the plan begins in Fall 2018 so that a complete assessment cycle is completed in spring 2021.

- Course learning outcomes for the 2017-2018 academic year were inputted into the TracDat system
- Senior survey was reviewed and compared between the two campuses in spring 2018
- IAB survey was issued in Spring 2018
- The alumni survey will be issued in 2021

9.1.2 EDUCATIONAL UNIT STRATEGIC PLAN

9.1.2.1 SYSTEMATIC AND SUSTAINED EFFORT TO ENABLE THE PROGRAM TO FULFILL ITS MISSION

The Program is focused three major themes of Transformative Educational Experience, Excellence and Opportunity, and Enrollment to ensure it meets the mission's 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

The Strategic Plan defines how we are fulfilling our mission.

9.1.2.2 INTERNAL STATUS OF THE PROGRAM RESOURCES AND EXTERNAL FACTORS THAT INFLUENCE THE OPERATION OF THE PROGRAM

There have been 3 major areas of concern regarding Program resources over the past several years:

- Adequate faculty
- Financial needs to fund the Program
- Secretarial staffing

All of these areas of concern stem back to the university's budget cuts due to overall declining enrollment.

The need for replacement and additional faculty has been essentially resolved over the past year. The Program hired a new faculty member in August 2017, January 2018, and has a new faculty member starting August 2018. Per the faculty load document referenced in Section 4.1.3 and seen in Appendix J, overloads have been reduced significantly and are considered manageable. However, enrollment for Fall 2018 looks to be quite strong and may result in more overloads returning. Overloads pull faculty away from other Program needs such as recruiting, PR,

The Supply & Expense budget provided to the Program by the university has been steadily declining over the past 6 years, despite enrollment increasing over that same time period. The Program does not have adequate funds to support any new initiatives (including a new lab for our new Mechanical and Electrical Systems Practices courses that have been added to the Program) or very much faculty development.

Secretarial staffing has been reduced such that our Program Secretary is now shared with the HVACR Program and the School of Built Environment (of which the Program is a part). This is actually a worse situation than seen at previous accreditation visits.

9.1.2.3 STRATEGIC PLAN UPDATE STATUS AND INPUT

The Program's Strategic Plan is updated every 6 years to coincide with its re-accreditation cycle. This also fits within the university's Academic Program Review cycle which allows the Program to use this report for its submission. It relies on input from the faculty, IAB, students, the Director of the School of Built Environment, and the Dean.

9.1.3 DEGREE PROGRAM ASSESSMENT PLAN

9.1.3.1 MISSION STATEMENT OF THE DEGREE PROGRAM

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

9.1.3.2 DEGREE PROGRAM OBJECTIVES

- Serve the students
- Serve the industry

These objectives are met by focusing on the following:

1. Maintain a high quality curriculum content by meeting its accrediting body's 20 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

9.1.3.3 PROGRAM LEARNING OUTCOMES

The Program has one Learning Outcome: Meet all ACCE 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.

9.1.3.4 ASSESSMENT TOOLS USED TO MEASURE PROGRAM OBJECTIVES AND PROGRAM LEARNING OUTCOMES

The assessment tools used to measure objectives and learning outcomes are a mix of direct measures and indirect measures. The direct measures of the SLOs are completed each semester that a class is taught. Direct measures include assignments, exams, and projects. Rubrics for grading vary depending upon what is being assessed.

Indirectly, the senior survey uses a 10 point Likert scale that asks students to rank how well they believe the Program prepared them for the knowledge expected in each SLO. The IAB and alumni survey use a 5 point Likert scale.

The annual student feedback session with the IAB is discussed with the faculty afterward and together with the IAB, it is determined whether a stated concern is valid and should be addressed.

9.1.3.5 PERFORMANCE CRITERIA USED TO MEASURE ACHIEVEMENT OF PROGRAM OBJECTIVES

The baseline performance criteria as a minimum established by the faculty unit for the direct is 70% of the students will achieve a 70% or better. Faculty have the option to increase the performance criteria. The indirect measures performance criteria is 70%.

9.1.3.6 EVALUATION METHODOLOGY USED FOR DATA COLLECTION

Each faculty member assess their course learning outcomes each semester the course is taught. The faculty unit meets once a year to discuss the results, determine if there are any areas of concern, and also decide whether the method of assessment is valid or should be changed. At this same time, the senior survey is also reviewed for a subjective opinion on how well the Program meets the SLOs.

Every three years, the Program completes a comprehensive evaluation of the Program's classes along with multiple indirect measures – alumni surveys, IAB surveys, and the 3 year trends noticed in the senior surveys.

9.1.4 ASSESSMENT IMPLEMENTATION PLAN

9.1.4.1 COMPREHENSIVE ASSESSMENT OF PROGRAM GOALS AND LEARNING OUTCOMES

Each course's assessment results are entered into TracDat after each semester. If a measurement falls below 70% for a given semester, the faculty member determines a course of action and makes a revision for the next semester that the course is taught. This can be seen in the assessment course results shared in Appendix H. If the result is repeated the next semester, the faculty unit will discuss possible reasons for the repeated result after course revisions and develop a plan of action.

9.1.4.2 RESULTS OF EACH ASSESSMENT CYCLE ARE DOCUMENTED

Now that there is a new curriculum in place, the Program has just implemented its new Assessment Plan. The Assessment Plan's assessment cycle of all Student Learning Outcomes is a 3 year cycle. Thus the first major review of the overall Program as a cohesive unit will occur just after the graduation of the first class accepted into the new curriculum (Spring 2021).

Results of individual course assessments and the 20 SLOs from the 2017-2018 academic year will be available on the Program's website when it is updated this summer.

9.1.4.3 EVALUATION OF PROGRAM OBJECTIVE AND LEARNING OUTCOMES COMPARED TO THE STATED PERFORMANCE CRITERIA

The spring semester meeting was spent getting our Course Learning Outcomes and assessment results into our system, TracDat, and comparing the senior surveys from the Big Rapids and Grand Rapids campus.

The Program Objectives and Learning Outcomes were confirmed.

9.1.4.1 AFTER EACH COMPREHENSIVE ASESSMENT CYCLE, THE ENTIRE PROCESS IS REVIEWED AND UPDATED

A comprehensive review cycle is conducted every three years which coincides with the Program's Grand Rapids cohort. Three years allows adequate time to review all 30+ courses taught by the Program faculty toward the AAS and BS degrees.

SECTION 10

REVIEW LAST VSITING TEAM REPORT: WEAKNESSES AND CONCERNS

10.1 PREVIOUS ACCREDITATION ACTIONS

The previous re-accreditation report from 2012 identified three (3) weaknesses and six (6) concerns. All except 1 were addressed by the end of the 3rd Year Report. Weaknesses and concerns reported are shown first in a lighter font color. How the Program addressed those items is shown in italics

The three weaknesses were:

- #1 - The Academic Quality Plan did not include sufficiently documented systematic means of collecting, quantifying, and analyzing data relevant to stated outcomes. Additionally the conclusions and inferences drawn from the quality assessment process were not incorporated in the Academic Quality Plan. This was a Weakness in the previous Visiting Team Report.
    - *See Section 9 of this self-report*

- #2 - Insufficient Evidence of Adequate Coverage of Ethics - The curriculum does not contain the required 15 contact hours of Ethics instruction
    - *Ethics is now addressed in a stand-alone course in the new curriculum (CONM 373 Ethics and Professionalism in Construction) as well as throughout other courses – specifically CONM 211 Construction Estimating I and CONM 424 Safety and Management.*

- #3 - The assessment measures related to student achievement, the rate and type of employment to graduates were not provided to the public. Also results of the assessment and the action plan as a result of the feedback do not show in the information provided.
    - The Program's website is being updated this summer to be in compliance with accessibility requirements. It will include all pertinent information to be provided to the public.

The six concerns were:

- #1 - Declining enrollment - The program has experienced diminishing enrollment over the past few years. This could be attributed to the reduction in employment of the construction industry.
    - *Enrollment has been steadily increasing since the 2012-2013 academic year when the previous report was completed.*

- #2 - Tracking graduates - Documentation indicating how graduates are tracked and the information gathered from them for assessment purposes was limited. This could have an adverse effect on the completion of the Academic Quality Plan.
    - *The University tracks graduates and maintains a database.*

  - *The senior survey issued by the Program procures information about the graduates' future plans and their opinions of the program for assessment purposes*

- #3 - Insufficient evidence of faculty pursuing scholarly and creative activities - Although there is a very comprehensive tenure and promotion document that addresses professional growth at Ferris State, there was little documentation that faculty were pursuing appropriate scholarly activities essential to the successful conduct of an academic program of construction.
  - *Many faculty pursue continuing education opportunities and others attend industry association meetings. See the curricula vitae in Appendix A.*

- #4 - Inadequate documented feedback on oral and written student work - There was little evidence of adequate feedback on oral and written assignments. The majority of assignments displayed only included numerical grades and check marks.
  - *See the examples of graded work in Appendix G*

- #5 - Insufficient Administrative Support - There has been some improvement since the last visit in which this was listed as a Weakness. However there still is insufficient administrative support in order to complete the required tasks such as collecting and analyzing data for a comprehensive Academic Quality Plan
  - *This continues to be an issue and has in fact gotten worse as our enrollment has increased since the previous visit and our Program Secretary is now shared with the HVACR Program and also serves as the Secretary for the School of the Built Environment.*

- #6 - Interim status of current Dean – this was a concern in the previous report as well.
  - *We had a permanent Dean in place for 5 years, however, he is retiring June 2018. An Interim Dean has already been named and he will be in place for 1-2 years for consistency*.

Updated TracDAT Assessment Results

Summary Document of SLOs with TracDAT Results

Ferris State University – College of Engineering Technology – School of Built Environment – Construction Technology and Management Program

Self-Study for the Re-Accreditation of the Bachelor of Science in Construction Management Degree

Prepared for the American Council for Construction Education

June 2018

Volume II Appendix H – Updated

Assessment: Course Four Column

Z - BCTM Courses

BCTM ---:BCTM General Credit

No data found for the selected criteria.

BCTM 213:Wood-Steel Framing and Finish

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Complete the layout, assembly, and construction of a 2-story structure comprised of wood and metal studs **Course Outcome Status:** Active **Start Date:** 04/01/2015	**Z - Other - specify -** Satisfactory completion of wood framed structure as determined by faculty (current faculty is a journeyman carpenter) **Criterion for Success:** 70% of student participation **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of students met requirement (12/15/2017)	**Action:** No action required (12/15/2017)
	Z - Other - specify - Satisfactory completion of steel framed structure as determined by faculty (current faculty is a journeyman carpenter) **Criterion for Success:** 70% of student participation **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% student completion (12/15/2017)	
Outcome #2 - Understand carpentry skills and methods utilized in the construction industry. **Course Outcome Status:** Active **Start Date:** 04/01/2015	**Test - Internally Developed - Pre/Post or Post -** Final exam **Criterion for Success:** Successfully perform mathematical requirements and layout for a wood framed wall, stair and common, hip and jack rafter. **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of students met 70% (05/07/2018)	**Action:** No action required (12/15/2017)
Outcome #3 - Apply principles of construction mathematics. **Course Outcome Status:** Active **Start Date:** 04/01/2015	**Test - Internally Developed - Pre/Post or Post -** Final exam **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the test. **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of students accomplished a score of 70% or better on test. (12/15/2017)	**Action:** No action required (12/15/2017)

BCTM 217:Virtual Design and Construction

Course Outcomes	Assessment Methods	Results	Actions
Building Models - Acquire knowledge and skills to generate and modify Building Information Technology models of MEP (Mechanical, Electrical, Plumbing) systems. (ACCE SLO#10) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Manipulate 3D models of mechanical, electrical, and plumbing systems **Criterion for Success:** 70% of the students will achieve a 70% or greater **Assessment Schedule:** yearly		
3D Geometry Combination - Demonstrate how to combine 3D geometry from cross disciplines into one scene to enable effective model reviews. (ACCE SLO#10) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Clash models of a building's different systems to find interferences **Criterion for Success:** 70% will achieve a 70% or better		
Extract Information - Create and modify basic Building Information Technology models of Civil, Architecture, Structure, and MEP (Mechanical, Electrical, Plumbing) to extract specific information in multiple dimensions. (ACCE SLO#10) **Course Outcome Status:** Active	**Project/Model/Invention -** Create a 3D model of a building with its mechanical, electrical, and plumbing systems **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Documentation and Animation - Document and animate models and their extracted information (ACCE SLO#1) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Create a report with model information **Criterion for Success:** 70% will achieve a 70% or better		

BCTM 234:Electrical Construction Practices

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 Construction Documents - Understand and interpret construction documents **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Use construction documents to answer questions pertaining to electrical systems **Criterion for Success:** 70% will receive a 70% or better **Assessment Schedule:** yearly		
Outcome #2 Systems Operation - Describe basic system(s) theory and operation (ACCE SLO #20) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Explain the basic principles of construction electrical systems **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #3 - Identification - Identify major materials, equipment, and appurtenances **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify materials and equipment from construction drawings **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #4 - Site Issues and Methods - Explain site issues and construction methods for systems installation and testing **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify typical site conditions encountered with electrical systems and the methods used for installation **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #5 - Techniques - Demonstrate basic construction techniques common to these systems **Course Outcome Status:** Active	**Observations (e.g. Clinical or Field) -** Lab observations as students complete basic electrical installation practices **Criterion for Success:** 70% will achieve a 70% or better		

Course Outcomes	Assessment Methods	Results	Actions
	Assessment Schedule: yearly		

BCTM 235:Mechanical Construction Practices

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Construction Documents - Understand and interpret construction documents **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Use construction documents to answer questions related to mechanical systems **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #2 - System Operation - Describe basic system(s) theory and operation (ACCE SLO #20) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Explain the basic principles of construction mechanical systems **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #3 - Identification - Identify major materials, equipment and appurtenances **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify materials, equipment from construction drawings **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #4 - Site Issues and Methods - Explain site issues and construction methods for systems installation and testing **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify typical site conditions encountered with mechanical systems and the methods used for installation **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #5 - Techniques - Demonstrate basic construction techniques common to these systems **Course Outcome Status:** Active	**Observations (e.g. Clinical or Field) -** Lab observations as students complete basic mechanical installation practices **Criterion for Success:** 70% will achieve a 70% or better		

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
	Assessment Schedule: yearly		

BCTM 297:Special Studies in BCTM

No data found for the selected criteria.

Assessment: Course Four Column

Z - CETM Courses

CETM ---:CETM General Credit

No data found for the selected criteria.

CETM 214:Adv Mat'ls Properties-Testing

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Analyze and blend aggregate for a HMA trial batch designed to meet Superpave sepcifications. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% success	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 89% Completion (05/23/2018)	
Outcome #2 - Compute and plot aggregate gradation blends on the FHWA .45 power chart. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% Average completion (05/23/2018)	
Outcome #3 - Test and identify aggregate properties that meet Superpave criteria. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 82% Average (05/23/2018)	
Outcome #4 - Compute HMA volumetrics and proposed mix designs, test HMA trial batches and compare test results to Superpave criteria. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Homework and hands on exercises in lab combined with exam. **Criterion for Success:** Over 70% score	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% completion (05/23/2018)	

CETM 215:Construction Equipment-Operat

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Calculate the owning and operating cost of numerous pieces of construction equipment. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2016 - 2017 (Fall 2016), 2017 - 2018 (Fall 2017) **Start Date:** 05/01/2016 **End Date:** 05/01/2018	**Case Studies/Problem-based Assignments -** Student homework and exam problems **Criterion for Success:** Completion of problems with above 70%	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 95% successful completion (05/15/2018)	
Outcome #2 - Determine the equipment production rates for earthwork equipment, pavement equipment used on highway and bridge construction. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Exams and Homework problems **Criterion for Success:** Above 70% score	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 81% successful completion (05/15/2018)	

CETM 226:Highway Technology

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Perform the planning and design processes for highways. **Course Outcome Status:** Active	Exam and homework exercises **Criterion for Success:** 70% Completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 70% Completion (05/23/2018)	
Outcome #2 - Demonstrate the methods utilized by AASHTO for geometric and pavement design. **Course Outcome Status:** Active	Students are to do a semester project which includes designing a sag vertical curve including all associated geometric elements and quantities. **Criterion for Success:** 70% completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 82% Completion (05/23/2018)	
Outcome #3 - Draw road plans utilizing AutoCAD. **Course Outcome Status:** Active	Students draw road section elements on AutoCAD and create profile, cross section, and typical sections **Criterion for Success:** 70% completion	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% Completion (05/23/2018)	

CETM 227:Hydraulics and Hydrology

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Hydrostatic Pressure - Calculate hydrostatic pressures and resultant vector forces and their locations on submerged surfaces **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Complete calculations to determine the pressure on a submerged surface such as a gate or dam **Criterion for Success:** 70% of students will achieve a 70% or better score **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% of students achieved a 70% or better on these asignments (05/31/2018)	**Action:** No Action Required (05/31/2018)
Outcome #2 - Hydrodynamic Calculations - Perform hydrodynamic calculations on fluids in open and closed conduits (ACCE SLO #20) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Perform hydrodynamic calculations on fluids in open and closed conduits **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved a 70% or better (05/31/2018)	**Action:** No Action Required (05/31/2018)
Outcome #3 - Hydrologic Calculations - Perform hydrologic calculations on a watershed **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Perform hydrologic calculations on a watershed **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved 70% or better (06/01/2018)	**Action:** No Action Required (05/31/2018)
Outcome #4 - Hydraulic Methods - Understand hydraulic methods of storm water control **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Explain hydraulic methods of storm water control **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80% achieved a 70% or better (05/31/2018)	**Action:** No Action Required (05/31/2018)

CETM 230:MDOT Certification Preparation

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Upon completion of this course the student will be prepared to take the written and laboratory MDOT certifications in Aggregate, Bituminous, and Density Control. **Course Outcome Status:** Active			

CETM 290:Special Topics in CETM

No data found for the selected criteria.

CETM 297:Special Studies in CETM

No data found for the selected criteria.

CETM 327:Hydraulics and Hydrology

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Calculate the hydrostatic pressure as well as the resultant vector force and its locatioin on any submerged surface. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** Learning **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Successful completion of homework assignments. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 70% or higher on the assignment. (05/07/2018)	
Outcome #2 - Calculate the buoyant force on a submerged object. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Weekly assignments that involve written problem solving method. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94% of students scored 70% or higher. (05/07/2018)	
Outcome #3 - Perform calculations related to fluids in motion, including Bernoulli's Equation, pipe flow, flow measurement and open channel flow. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Weekly problem solving assignments **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 89% of students earned a score of 70% or higher. (05/07/2018)	
Outcome #4 - Calculate rainfall and watershed runoff from a tract of land based on the probability of a particular storm. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Written assignments of covered topics. **Criterion for Success:** 70% of students will achieve a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94% of students scored 70% or higher. (05/07/2018)	
Outcome #5 - Complete a comprehensive problem utilizing all the major components listed above. **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Case Studies/Problem-based Assignments -** Student will complete a comprehensive problem utilizing all major components above. **Criterion for Success:** 70% of students will achieve a score of 70% or greater **Assessment Schedule:** final project	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83% of students earned a score of 70% or higher. (05/07/2018)	

Course Outcomes	Assessment Methods	Results	Actions
	at the end of the semester		

Assessment: Course Four Column

Z - CONM Courses

CONM ---:CONM General Credit

No data found for the selected criteria.

CONM 100:Orien to Const Tech - Mgmt

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Connect with faculty and the university **Course Outcome Status:** Active	Each faculty member will make a short presentation to the CONM-100 students **Criterion for Success:** Role will be taken in the class	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Criterion Met Students signed the role sheet (03/30/2011)	
	Students are required to see their adviser **Criterion for Success:** Students will present a signed document from their adviser	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Criterion Met Students have returned the signed document (03/30/2011)	
Outcome #2 - Gaining a basic level of understanding about useful learning strategies. **Course Outcome Status:** Active	Students will participate in programs related to Time Management, Study Skills, Good Health Habits and Procrastination **Criterion for Success:** Students will participated in quizes/surveys to confirm their participation in the activity.		
Outcome #3 - Use campus and community resources along with a basic ability to determine when and how to access them **Course Outcome Status:** Active	Students are required to attend several activities on campus i.e. "Beer Booze and Books", "Sex and the College Student, ACS meeting, SLC meeting, "Test Taking Tips", etc. **Criterion for Success:** Students will present documentation that they attend these events.		
Outcome #4 - Understand issues surrounding personal health and social choices and accountability to self and community **Course Outcome Status:** Active	Students will participate in activities presented by "Good Choices", Educational and Career Counseling Center, Office Student Conduct Center, Library Services and Student Services **Criterion for Success:** Activities		

Course Outcomes	Assessment Methods	Results	Actions
	conclude with a survey/quiz that is collected and evaluated for participation		
Outcome #5 - Use academic advising and current campus technologies for learning, communication and registration **Course Outcome Status:** Active	Students will log into My Degree and check their current status. Students will compose a schedule for spring semester and present it to their adviser **Criterion for Success:** Students will return a signed document from their adviser		
Outcome #6 - Briefly describe the history of construction **Course Outcome Status:** Active			

CONM 111:Construction Practices

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Structural Layout - Apply methods of structural layout (ACCE 11). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **Start Date:** 12/15/2015	**Test - Internally Developed - Pre/Post or Post -** Students will be required to pass Test #1. Test #1 tests an understanding and application of basic construction math, vertical and horizontal measurement as applied to a benchmark and control points. Math is applied to elevation (design) information. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the Test #1. **Assessment Schedule:** During Spring Semester - Even years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% of the class passed Test#1 with a median grade of 76.9% (05/04/2018)	**Action:** No further action at this time. (08/14/2016)
Outcome #2 - Materials and Methods - Demonstrate an understanding of materials and methods of construction (ACCE 19). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Summer 2018) **Start Date:** 12/15/2015	**Test - Internally Developed - Pre/Post or Post -** Students will be required to pass Test #1. Test #1 tests an understanding and application of basic construction math, vertical and horizontal measurement as applied to a benchmark and control points. Math is applied to elevation (design) information. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the Test #1. **Assessment Schedule:** During Spring Semester - Even years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84% of the class passed Test#1 with a median grade of 76.9% (05/04/2018)	**Action:** No action required (05/04/2018) **Action:** No further action at this time. (08/14/2016)
	Test - Internally Developed - Pre/Post or Post - 80% of the students will earn a passing grade on Test #2. Test #2 consists of masonry and concrete (including resteel) quantity takeoff. **Criterion for Success:** 80% of the	**Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 91% of the class passed Test#1 with a median grade of 82.9% (08/14/2016)	**Action:** No further action at this time. (08/14/2016)

Course Outcomes	Assessment Methods	Results	Actions
	students will earn a passing grade of 65% or better on the Test #2. **Assessment Schedule:** During Spring Semester - Even years		
Outcome #3 - Safety - Demonstrate basic crew safety (ACCE 01). **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Summer 2018) **Start Date:** 01/15/2016	**Written Product (essay, research paper, journal, newsletter, etc.) -** Students will prepare a tool use safety presentation. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the tool use safety presentation. **Assessment Schedule:** Spring Semester - Even Years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the class earned a passing grade on the assignment with a median grade of 98.6%. (05/04/2018)	**Action:** No action required (05/04/2018)
Outcome #4 - Quantity Take-Offs - Prepare basic quantity take offs for materials. **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017) **Start Date:** 12/15/2015	**Project/Model/Invention -** Students will prepare a detailed quantity take off of an assigned model building. **Criterion for Success:** 80% of the students will earn a passing grade of 65% or better on the quantity take off assignment. **Assessment Schedule:** Spring Semester - Even Years	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the class earned a passing grade on the assignment with a median grade of 84.4%. (05/04/2018)	**Action:** No further action at this time. (05/04/2018)

CONM 112:Plans and Specifications

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Identify Plan Details - Identify specific dimensions, locations, installation, and material requirements on project plans and specifications. (ACCE SLO #7) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed -** **Pre/Post or Post -** Final Exam **Criterion for Success:** 70% will receive a 70% or greater on the final exam **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% achieved a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Basic QTO - Perform very basic quantity takeoffs from commercial and industrial construction plans **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed -** **Pre/Post or Post -** Final Exam - basic quantity takeoff from supplied drawings **Criterion for Success:** 70% of students will receive a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% achieved a 70% or better (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Road and Bridge Construction - Identify the components of road and bridge construction **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed -** **Pre/Post or Post -** Final Exam - portion dedicated to road and bridge construction - identify components from drawings **Criterion for Success:** 70% of students will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 70% achieved 70% or better on the final exam portion dedicated to bridges and road construction (05/21/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Explain the design process and how plans and specifications are intricately related **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Test - Internally Developed -** **Pre/Post or Post -** Midterm - describe the process steps from the Owner's concept to construction start **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Inconclusive Did not test for this outcome (06/01/2018)	**Action:** Add topic to midterm or final exam (05/25/2018)
Outcome #5 - Architectural and Engineering Scales - Accurately read an architectural and engineering scale **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Lab-based exercises in class reading lines at different architectural and engineering scales	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% could accurately read architectural and engineering scales (05/21/2018)	**Action:** No Action Required (06/01/2018)

Course Outcomes	Assessment Methods	Results	Actions
Planned Semester(s) of Assessment: 2017 - 2018 (Fall 2017)	**Criterion for Success:** 100% will achieve 100% on the in-class lab assignment **Assessment Schedule:** yearly		

CONM 116:Construction Graphics

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - 2D - Demonstrate basic graphic comminucation skills to communicate spontaneously with the client, supervisors and the various crafts in two dimensions (ACCE SLO #1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Project/Model/Invention -** Final project - student will design and hand draft floor plan, elevation, and an isometric **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** once a semester	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 81% achieved a 70% or greater (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 83% achieved a 70% or better (05/21/2018)	
		Reporting Period: 2017 - 2018 **Classification:** Criterion Met 87.5% achieved a 70% or greater on the final (05/07/2018)	
Outcome #2 - Three-Dimensional Skills - Demonstrate basic graphic communication skills to communicate spontaneously with the client, supervisors and the various crafts in three dimensions. (ACCE SLO#1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Fall 2017)	**Project/Model/Invention -** Final project - student will create a three-dimensional model on the computer of their final project **Criterion for Success:** 70% will receive a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% achieved a 70% or greater on their model (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 81% achieved a 70% or greater (05/21/2018)	
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 78% received a 70% or greater (05/21/2018)	

CONM 117:Construction Building Inf Tec

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Office Software - Demonstrate word processing, spreadsheet, and presentation software proficiency on a variety of assignments typical in the construction industry. (ACCE SLO #1) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Test - Internally Developed - Pre/Post or Post -** Midterm exam to create or manipulate word processing, spreadsheets, and presentation software **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% received a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or higher (05/21/2018)	
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 91.5% received a 70% or higher (05/21/2018)	
Outcome #2 - Building Information Technology (BIT) - Explain how Building Information Technology (BIT) is used in the industry and the processes that make up BIT as they apply to information in a company that uses BIT techniques (ACCE SLO #10) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Test - Internally Developed - Pre/Post or Post -** Final exam - Explain how BIM is used in the industry **Criterion for Success:** 70 % will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% achieved a 70% or better (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or better (05/21/2018)	
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 80% received a 70% or better (05/21/2018)	
Outcome #3 - Building Information Modeling (BIM) - Create and modify basic multi-dimensional Building Information Technology models with Civil, Architecture, and Structure (ACCE SLO #10) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018)	**Project/Model/Invention -** Building Study project that uses plans and specifications from CONM 112 and includes sitework, architecture, and structural components **Criterion for Success:** 70% will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 74% received a 70% or higher (05/21/2018)	**Action:** No Action Required (05/25/2018)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Not Met 50% received a 70% or higher. Several did not submit project (05/21/2018)	**Action:** Keep daily assignments for project up to date in Blackboard for student access. Assess student work each day in class to ensure they are keeping up (05/07/2016)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 86% received a 70% or better on their project (05/21/2018)	

CONM 121:Materials Properties-Testing

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Properties - Describe the properties of construction materials. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Determine the properties/characteristics of various construction materials **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** 3 Tests Per Semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% of the students received a 70% or greater on all three tests. (05/07/2018)	**Action:** No action needed. (05/07/2018)
Outcome #2 - Testing (ACCE SLO #8) - Demonstrate an understanding of material properties through industry-standard testing. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Solve problems based on construction material properties **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** 3 Tests per Semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 72% of the students received a 70% or greater on all three tests. (05/07/2018)	**Action:** No action needed. (05/07/2018)
Outcome #3 Lab Report (ACCE SLO #1) - Create formal written laboratory reports. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Generate lab reports for appropriate tests conducted during labs **Criterion for Success:** 70% of students receive a score of 70% or greater **Assessment Schedule:** Minimum of two formal lab reports required per semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83% of the students received a 70% or greater on all formal lab reports. (05/07/2018)	**Action:** No action required. (05/07/2018)

CONM 122:Const Surveying-Layout

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Field measurement data - The learner will be able to accurately measure and record surveying field data. ACCE #11 **Course Outcome Status:** Active **Start Date:** 09/26/2011	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the assignment. (12/16/2016)	**Action:** None needed at this time. (12/16/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 89% of students accomplished a score of 70% or better on the assignment. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 78% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Outcome #2 - Construction layout data - The learner will be able to accurately calculate and layout construction surveying data. ACCE#11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or greater on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 93% of the students accomplished a score of 70% or greater on the assignment. (12/16/2016)	**Action:** None needed at this time. (12/16/2016)

Course Outcomes	Assessment Methods	Results	Actions
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 82% of the students accomplished a score of 70% or greater on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 89% of the students accomplished a score of 70% or better on the assignment. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 75% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)

CONM 211:Construction Estimating 1

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Estimating Data - Obtain estimating data from industry sources. (ACCE SLO#4) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment - Use RS Means to procure unit costs, city indexes, and crew information **Criterion for Success:** 70% of students will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 75% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Quantity Takeoff - Perform quantity takeoffs utilizing contract documents. (ACCE SLO#4) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Examination - Complete various quantity takeoffs **Criterion for Success:** 70% shall achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84.4% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Proposal - Complete a bid proposal. (ACCE SLO#4)	**Test - Internally Developed - Pre/Post or Post -** Examination - Fill out a bid proposal **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Actions Required (05/25/2018)
Technology - Utilize technology to complete bid estimates. (ACCE SLO#4, ACCE SLO#10) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment - Create an estimate using computer software **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93.8% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Ethics - Discuss ethical issues in bidding. (ACCE SLO#6) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87.5% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 212:Soils and Foundations

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Soil/Water Interaction - Recognize the interaction between water and soil. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify expected behavior when different soils are exposed to water **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 77.8% (07/26/2018)	
Outcome #2 - Bearing Capacity - Calculate soil bearing capacity (ACCE SLO #8) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Calculate soil bearing capacity **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 82.6% (07/26/2018)	
Outcome #3 - Compaction - Identify the elements of soil compaction. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Identify different methods of soil compaction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 84.1% (07/26/2018)	
Outcome #4 - Soil Characteristics - Identify soil characteristics using field and laboratory techniques. **Course Outcome Status:** Active	**Observations (e.g. Clinical or Field) -** Identify soil characteristics in the lab **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 73.4% (07/26/2018)	
Outcome #5 - Design - Understand principles of foundation design an analysis (ACCE SLO #19) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Determine required foundation sizes given certain soil parameters and characteristics **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 80.3% (07/26/2018)	

CONM 221:Statics and Structures

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Static Equilibrium - Understand equilibrium, free body diagrams, and vector analysis. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - draw a free body diagram to explain structural forces **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given during the semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)
Outcome #2 - Structures - Apply the concepts of equilibrium and free body diagrams to the analysis and design of basic structural elements. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test - Develop equations of static equilibrium for different forces **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given over the semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)
Outcome #3 - Materials (ACCE SLO #19) - Apply structural analysis and design using wood and metals. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test **Criterion for Success:** 70% of the students receive 70% or greater score **Assessment Schedule:** Three tests are given per semester.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81% of the students received a 70% or better on the combined exams. (05/07/2018)	**Action:** No action required. (05/07/2018)

CONM 222:Construction Administration

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Delivery Systems - Understand construction delivery systems. (ACCE SLO #12) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CRO - Complete an organization chart for a CM using a specific type of contract; identify the trade worker with the worker description provided by BLS **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 83.3% students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Scheduling - Understand basic elements of construction scheduling. (ACCE SLO #5) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment PPA - Identify different scheduling methods, define scheduling terms, estimate the duration of given activities **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 91.7% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Documentation - Create basic construction documentation. (ACCE SLO #7) **Course Outcome Status:** Active	**Certification Exam -** PROC Assignment - Complete the Procore Project Manager Core Tools certificate and one of the following: Project Management; Quality & Safety; Superintendent; Engineer; Subcontractor **Criterion for Success:** 75% of students score 75% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 91.7% of students scored 75% or better. (05/24/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Quality - Understand the requirements of delivering a construction project based on time, cost and quality. (ACCE SLO #14, ACCE SLO #15) **Course Outcome Status:** Active	**Certification Exam -** Assignment PROC (Project Manager – Quality & Safety segment) **Criterion for Success:** 75% of students score 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 81.3% of students scored 75% or better (05/07/2018)	**Action:** No Actions Required (05/25/2018)
	Case Studies/Problem-based	**Reporting Period:** 2017 - 2018	**Action:** No Action Required

Course Outcomes	Assessment Methods	Results	Actions
	Assignments - Assignment PRC **Criterion for Success:** 75% of students score 75% or better	**Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	(05/25/2018)
Outcome #5 - Changes in Construction - Understand the nature of changes to the construction process. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CHG ORD **Criterion for Success:** 75% of students score 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93.8% of students scored 75% or better (05/24/2018)	**Action:** No Action Required (05/25/2018)

CONM 225:Field Engineering

Course Outcomes	Assessment Methods	Results	Actions
Soil erosion - Examine site erosion and storm water control. ACCE #7 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Internal exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% of better on the exam. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the exam. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 73% of the students accomplished a score of 70% or better on the exam. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 82% of the students accomplished a score of 70% or better on the exam. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Project controls - Examine codes, ordinance, regulations, and operations documentation. ACCE #7 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Internal exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the exam. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Not Met 59% of the students accomplished a score of 70% or better on the exam. (12/09/2016)	**Action:** Review exam to verify clarity and intent of exam questions. (12/09/2016) **Follow-Up:** Revised exam

Course Outcomes	Assessment Methods	Results	Actions
			questions to better relate material covered in the course to the intent of the exam questions. (02/14/2018)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 81% of the students accomplished a score of 70% or better on the exam. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the exam. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)
Filed measurement data - Accurately establish and calculate horizontal and vertical control points for construction layout. ACCE #11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93% of the students accomplished a score 70% or better on the assignment. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 92% of the students accomplished a score of 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the assignment. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 98% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 94 % of the students accomplished a score of 70% or better on the assignment. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met	**Action:** None needed at this time. (05/15/2015)

Course Outcomes	Assessment Methods	Results	Actions
		100% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	
Construction layout data - Accurately calculate and perform construction layout. ACCE #11 **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Lab report. **Criterion for Success:** 70% of the students will accomplish a score of 70% or greater on the assignment. **Assessment Schedule:** Once every course.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Not Met 69% of the students accomplished a score of 70% or better on the assignment. (12/15/2017)	**Action:** Score below minimum criteria set was due to students not completing all of the assignment. No action is needed at this time. (03/21/2018) **Follow-Up:** Removing scores of zero for non complete work, raised the average grade to above the minimum criteria. Confirmed that no action is needed at this time. (01/19/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 98% of the students accomplished a score of 70% or better on the assignment. (12/09/2016)	**Action:** None needed at this time. (12/09/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 79% of the students accomplished a score of 70% or better on the assignment. (12/11/2015)	**Action:** None needed at this time. (12/11/2015)
		Reporting Period: 2014 - 2015 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the assignment. (05/15/2015)	**Action:** None needed at this time. (05/15/2015)

CONM 290:Special Topics in CONM

No data found for the selected criteria.

CONM 297:Special Studies in CONM

No data found for the selected criteria.

CONM 311:Formwork-Temp Structures

Course Outcomes	Assessment Methods	Results	Actions
Temporary Loads - Calculate basic loads and forces on temporary structures. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework # 2 **Criterion for Success:** 70% of students will accomplish a score of 70% or better **Assessment Schedule:** once an academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 80% of students accomplished a score of 70% or better (12/09/2016)	**Action:** None required (12/09/2016)
Rigging - Recognize the major elements of construction rigging. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Test **Criterion for Success:** 70% of students receive a score of 70% or greater	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
Materials and Methods (ACCE SLO #8) - Identify the most common materials and methods used in concrete installation. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Project assignment # 2 **Criterion for Success:** 70% students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 92% students scored 70% or better (12/09/2016)	**Action:** None required (12/09/2016)
Design Loads - Calculate design loads and pressures in formwork applications. **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Test and Formwork Project **Criterion for Success:** 70% of students will receive a 70% grade or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	**Action:** No action required. (05/07/2018)
Design (ACCE SLO #8 & #19) - Select formwork members from applied loads and pressures.	**Written Product (essay, research paper, journal, newsletter, etc.) -** Project assignment # 2	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 85% of students received a score of 70% or better on the	**Action:** No action required. (05/07/2018)

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Course Outcome Status: Active	**Criterion for Success:** 70% of students accomplish 70% or better **Assessment Schedule:** once per academic year	Formwork Plan Project. 98% of students received a score of 70% or better on the combined semester tests. (05/07/2018)	

CONM 312:Construction Scheduling

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Activities - Develop an activity listing and corresponding duration for a construction project. (ACCE SLO #5) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment ADAD **Criterion for Success:** 75% of students will obtain 75% or better **Assessment Schedule:** Every term	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Not Met 55.5% students scored 75% or better. (05/07/2018)	**Action:** Increase emphasis how to break down activities and estimate duration. (05/07/2018)
Outcome #2 - Schedule - Develop a construction schedule both manually and electronically. (ACCE SLO #5, ACCE SLO #10) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment NCP6 **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Resources - Perform a resource allocation on a schedule. (ACCE SLO#16) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment RPS **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 77.8% of students scored 75% or better. (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Cost Loading - Calculate activity values and cost load the corresponding schedule. (ACCE SLO#14, ACCE SLO#16) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Assignment CPS **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 94.4% scored 75% or better. (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #5 - Final Schedule - Present a finalized construction schedule. (ACCE SLO #5) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Examination FE **Criterion for Success:** 75% of students will obtain 75% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 313:Construction Economics

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
NA - NA **Course Outcome Status:** No Longer an Outcome			

CONM 321:Construction Estimating II

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Conceptual - Develop conceptual estimates using various methods. (ACCE SLO #4) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97.0% scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #2 - Impacting Factors - Analyze factors that impact unit costs and productivity. (ACCE SLO #8) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 78.8% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #3 - Overhead and Profit - Describe overhead allocation and profit determination. (ACCE SLO #14) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #4 - Cost Control - Understand construction cost control. (ACCE SLO #14) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)
Outcome #5 - Statistics - Understand basic statistical techniques. **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Assignment **Criterion for Success:** 75% of students scored 75% or better.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90.9% of students scored 75% or better (05/07/2018)	**Action:** No Action Required (05/25/2018)

CONM 324:Adv Const Computer Techniques

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Software in Construction Operations - Demonstrate proficiency in the use of software application used in construction operations (ACCE SLO# 4, 10) **Course Outcome Status:** Active	Excel project to demonstrate mastery of an estimating program **Criterion for Success:** Mean average grade 80%	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87% of students achieved a score of 70% or more (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 79% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2011 - 2012 and Prior **Classification:** Criterion Met 81% (04/18/2011)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Demonstrate advanced capabilities in Microsoft Office products (Excel ,Word, PowerPoint) to include linking and embedding across various programs. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 87% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
Outcome #2 - Application of Industry-specific Technologies - Apply a variety of construction industry-specific technologies to construction projects (ACCE SLO# 4, 10) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Utilize construction specific software to perform take-offs of earthwork related activities. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Utilize construction specific software to perform take-offs of building components **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	

Course Outcomes	Assessment Methods	Results	Actions
	Case Studies/Problem-based Assignments - Utilize construction specific software to integrate schedules with 4D software. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
	Case Studies/Problem-based Assignments - Utilize construction specific software to coordinate 3D models between various stakeholders and improve construction efficiency and communication. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 93% of students achieved a score of 70% or better (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 97% of students achieved a score of 70% or greater (05/07/2018)	
	Case Studies/Problem-based Assignments - Utilize construction specific software to complete 5D take-offs of model based projects. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 95% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
Outcome #3 - Field Software and Technology - Demonstrate the use of advanced field software and technology applications **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Through the use of two tests determine advanced field technology understanding and application. **Criterion for Success:** 70% of students will achieve a score of 70% or better	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% of students scored a 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 96% of students achieved a score of 70% or greater. (05/07/2018)	**Action:** No action needed (05/07/2018)

CONM 373:Professionalism & Ethics in Construction

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Theories of Ethics - Evaluate the major theories of ethics **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Professional Codes - Understand professional codes of ethics **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Ehics skills for the industry - Develop leadership and ethical project management skills for the construction industry **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)			
Ethical dilemmas - Develop personal skills for facing ethical dilemmas (ACCE SLO #6) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2019 - 2020 (Fall 2019)	**Written Product (essay, research paper, journal, newsletter, etc.) -** Interview with a construction professional regarding ethical situations typical to construction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		

CONM 390:Special Topics in CONM

No data found for the selected criteria.

CONM 397:Special Studies in CONM

No data found for the selected criteria.

CONM 412:Construction Contracts

Course Outcomes	Assessment Methods	Results	Actions
Documents - Compare and contrast the standard documents used in the construction industry. ACCE #12 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 94% of the students accomplished a score of 70% or greater on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
Procedures - Interpret administrative procedures required by the contract documents. **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** test	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 97% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)
Law - Application of general business law as it applies to the construction industry. ACCE #17 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 84% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 93% of the students accomplished a score of 70% or better	**Action:** None needed at this time. (05/13/2016)

Course Outcomes	Assessment Methods	Results	Actions
		on the quiz. (05/13/2016)	
Risk - Evaluate inherent contractual risk. ACCE #13 **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Quiz **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the quiz. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the quiz. (12/15/2017)	**Action:** None needed at this time. (12/15/2017)
		Reporting Period: 2016 - 2017 **Classification:** Criterion Met 91% of the students accomplished a score of 70% or better on the quiz. (05/12/2017)	**Action:** None needed at this time. (05/12/2017)
		Reporting Period: 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the quiz. (05/13/2016)	**Action:** None needed at this time. (05/13/2016)

CONM 413:Construction Economics

Course Outcomes	Assessment Methods	Results	Actions
Alternative Selection - Perform comparative analysis using common techniques of "Engineering Economic Analysis". **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2015 - 2016 (Fall 2015) **Start Date:** 08/31/2015	**Test - Internally Developed - Pre/Post or Post -** Test No. 3: Net Present Worth and Annual Cash Flow Analysis **Criterion for Success:** 90% of students shall score 65% or better. **Assessment Schedule:** Course Reporting Champion: John Schmidt. Every third semester beginning with Fall 2015.	**Reporting Period:** 2016 - 2017 **Classification:** Criterion Met 90% of the students accomplished a score of 70% or better on the exam. (05/19/2017)	**Action:** None needed at this time. (05/19/2017)
	Test - Internally Developed - Pre/Post or Post - Exam. **Criterion for Success:** 70% of the students will accomplish a score of 70% or better on the exam. **Assessment Schedule:** Once an academic year.	**Reporting Period:** 2015 - 2016 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (12/18/2015)	**Action:** None needed at this time. (12/18/2015)
		Reporting Period: 2013 - 2014 **Classification:** Criterion Met 100% of the students accomplished a score of 70% or better on the exam. (05/16/2014)	**Action:** None needed at this time. (05/16/2014)

CONM 424:Construction Safety and Management

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 Application - Analyze the application of safety management in the construction industry **Course Outcome Status:** Active	**Presentation (Oral) -** Present a pre-approved safety topic to the class. 10 minute presentation **Criterion for Success:** 70% of the students will achieve a score of 70% or better **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students achieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)
	Test - Internally Developed - Pre/Post or Post - Evaluate methods of correcting safety hazards on a construction site **Criterion for Success:** 70% of students will achieve 70% or better **Assessment Schedule:** yearly	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 96% achieved a 70% or better (06/01/2018)	
Outcome #2 Safety Plan - Develop a Site Specific Safety Plan (ACCE SLO #3) **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 12/15/2017	**Written Product (essay, research paper, journal, newsletter, etc.) -** Student groups utilize a set of construction plans and specifications to analyze and develop a Site Specific Safety Plan. Each group approaches the project as an assigned sub contractor (e.g, masonry, concrete, steel, etc.) **Criterion for Success:** 70% of the students groups will receive a score of 70% or better **Assessment Schedule:** Every semester	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students achieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)
Outcome #3 Safety Ethics - Evaluate ethical conduct based upon the situation (ACCE SLO #6) **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Analyze a current case study highlighting ethical issues regarding safety. **Criterion for Success:** 70% of the students will receive a score of 70% or better. **Assessment Schedule:** Every	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of the students recieved a score of 70% or better (12/15/2017)	**Action:** No action required (12/15/2017)

Course Outcomes	Assessment Methods	Results	Actions
	semester		
Curriculum Revision - Revise the course to meet the requirements set forth by the Advisory Committee **Course Outcome Status:** No Longer an Outcome **Planned Semester(s) of Assessment:** Other **Start Date:** 04/01/2015	**Focus group -** prepare and submit the proper curriculum change forms to submit to the school, college and university curriculum committee **Criterion for Success:** the proposal is submitted and approved by all committees. **Assessment Schedule:** submission to school committee, then forwarded to the college curriculum committee, then forwarded to the university committe for final approval	**Reporting Period:** 2011 - 2012 and Prior **Classification:** Inconclusive Curriculum proposal was submitted to College Curriculum Committee (03/22/2012) **Curriculum Change:** Requires UCC Approval	**Action:** If approval is met by the College Curriculum Committee than that proposal will be submitted to the University Curriculum for final approval. (03/21/2012)

CONM 460:Current Topics in Construction Management

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Outcome #1 - Significance - Explain the significance of the current topic within the construction industry **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a three page paper investigating a current topic in the construction industry. **Criterion for Success:** 70% of students will achieve a score of 70% or better		
Outcome #2 - Ethics - Analyze any ethical conduct concerns with the current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Evaluate the proper ethical conduct based upon case study situations taken from sample cases provided by industry **Criterion for Success:** 70% of students will achieve a score of 70% or better		
Outcome #3 - Unique Methods - Identify any unique methods or costs associated with this current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Review a case study regarding a unique method and answer a set of ten questions. **Criterion for Success:** 70% of students will achieve a score of 70% or better		

CONM 461:Sustainability in Construction

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Significance - Explain and apply basic principles of sustainable construction (ACCE SLO #18) **Course Outcome Status:** Active	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a three page paper investigating a sustainability issue **Criterion for Success:** 70% of students will achieve a score of 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% achieved 70% or better (05/08/2018)	**Action:** No Action Required (05/08/2018)
Outcome #2 - Ethics - Analyze any ethical conduct concerns with the current topic **Course Outcome Status:** Active	**Case Studies/Problem-based Assignments -** Evaluate the proper ethical conduct based upon case study situations **Criterion for Success:** 70% of students will achieve a score of 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 92% achieved 70% or better (05/08/2018)	**Action:** No Action Required (06/01/2018)
Outcome #3 - Unique Methods - Explain/identify the different methods of rating sustainable building practices (ACCE SLO #18) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Review a case study regarding a unique method and answer a set of ten questions **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** as offered	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 87% achieved a 70% or better (05/08/2018)	**Action:** No Action Required (05/08/2018)

CONM 462:Power and Process Plant Construciton

Course Outcomes	*Assessment Methods*	*Results*	*Actions*
Project Characteristics - Describe the characteristics and components for construction of large plant facilities **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Energy Sources - Understand basic sources of energy and types of power generation and process plants **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Engineering Principles - Identify basic plant engineering principles **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Written Product (essay, research paper, journal, newsletter, etc.) -** Homework assignment **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 88% of students scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
Site Plan - Develop a large sscale site plan and project management plan **Course Outcome Status:** Active **Planned Semester(s) of Assessment:** 2017 - 2018 (Spring 2018) **End Date:** 05/04/2018	**Test - Internally Developed - Pre/Post or Post -** Project site and management plan in test format **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 95% of students scored 70% or better (05/07/2018)	**Action:** none rerquired (05/07/2018)

CONNM 463 :Infrastructure Construction

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 Design - Understand basic civil engineering design and construction for construction infrastructure **Course Outcome Status:** Active			
Outcome #2 - Documents - Review construction and design documents as part of construction planning **Course Outcome Status:** Active			
Outcome #3 - Materials and Methods - Understand major materials and construction methods used in infrastructure construction **Course Outcome Status:** Active			
Outcome #4 - Structural Behavior - Understand the basic elements of structural behavior in civil construction (ACCE SLO #19) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Analyze structural behavior of infrastructure construction **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
Outcome #5 - MEP - Understand the basic principles of mechanical, electrical, piping and plumbing planning. (ACCE SLO #20) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Describe the main components of MEP systems in civil projects **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		

CONM 490:Special Topics in CONM

No data found for the selected criteria.

CONM 497:Special Studies in CONM

No data found for the selected criteria.

CONM 499:Construction Project Mgmt

Course Outcomes	Assessment Methods	Results	Actions
Outcome #1 - Project Management - Understand the concepts of project management in the construction industry (ACCE SLO #7, 12) **Course Outcome Status:** Active	**Test - Internally Developed - Pre/Post or Post -** Final Exam **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 97% of students scored 70% or better (05/04/2018)	
	Test - Internally Developed - Pre/Post or Post - Analyze construction documents for planning and management of construction processes **Criterion for Success:** 70% will achieve a 70% or greater		
	Test - Internally Developed - Pre/Post or Post - Identify roles, responsibilities, and relationships of project delivery methods **Criterion for Success:** 70% will achieve a 70% or greater		
Outcome #4 - Presentation - Successfully present student team work to faculty and industry representatives (SLO #1, 2, 9) **Course Outcome Status:** Active	**Presentation (Oral) -** Student team presentation **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of student teams scored 70% or better (05/07/2018)	**Action:** none required (05/07/2018)
	Written Product (essay, research paper, journal, newsletter, etc.) - Create technical memoranda on student team project **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Each team member shall evaluate the teamwork performance of their		

Course Outcomes	Assessment Methods	Results	Actions
	own team members **Criterion for Success:** 70% shall achieve a 70% or greater **Assessment Schedule:** yearly		
Outcome #2 - Ethical Integration - Integrate technical, business, and ethical concerns in a project context. (ACCE SLO #6, 13) **Course Outcome Status:** Active	**Presentation (Oral) -** Student team presentation **Criterion for Success:** 70% of students score 70% or better **Assessment Schedule:** once per year academic year	**Reporting Period:** 2017 - 2018 **Classification:** Criterion Met 100% of student teams scored 70% or better (05/07/2018)	
	Test - Internally Developed - Pre/Post or Post - Evaluate construction industry ethical case studies **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		
	Test - Internally Developed - Pre/Post or Post - Explain/identify basic elements of risk analysis **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		
Outcome #3 - Submittals - Create professional construction management submittals from construction project documents (ACCE SLO #3, 4, 5, 9, 15, 16) - safety plan, estimate, schedule, team member evaluation, QA/QC, project control process	**Written Product (essay, research paper, journal, newsletter, etc.) -** Write a portion of a project safety plan for a construction project **Criterion for Success:** 70% will achieve a 70% or better		
	Written Product (essay, research paper, journal, newsletter, etc.) - Prepare a project cost estimate as part of a student team **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Prepare a project schedule as part of		

Course Outcomes	Assessment Methods	Results	Actions
	a student team **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly **Written Product (essay, research paper, journal, newsletter, etc.) -** Each team member is evaluated by the other team members for their participation in teamwork activities **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Written Product (essay, research paper, journal, newsletter, etc.) - Complete a project QA/QC plan as part of the student team project **Criterion for Success:** 70% will achieve a 70% or better **Assessment Schedule:** yearly		
	Test - Internally Developed - Pre/Post or Post - Identify project control techniques **Criterion for Success:** 70% will achieve a 70% or greater **Assessment Schedule:** yearly		

SLO #1	Create written communication appropriate to the construction discipline			Direct Assessments	
COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
BCTM 217 Virtual Design and Construction	Assignment	Create a model for presentation and document the extracted information	Course is new in Spring 2019	NA	NA
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
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	78% achieved a 70% or greater	YES
CONM 117 Construction Building Information Technology	Tets - Internal	Manipulate or create word processing documents, spreadsheets, and presentation software	Midterm exam with Word, Excel, Powerpoint	91.5% achived a 70% or better	YES
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	83% achieved a 70% or better	YES
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 #1	Create written communication appropriate to the construction discipline		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	4 Met Expectations 7 Exceeded Expectations	YES

SLO #2	Create oral presentation appropriate to the construction industry			Direct Assessments	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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
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 #2	Create oral presentation appropriate to the construction industry		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.88	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	6 Met Expectations 5 Exceeded Expectations	YES

SLO #3	Create a construction safety plan			Direct Assessments	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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
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
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
CONM 499 Construction Project Management	Written Product	Write a portion of a project safety plan for a construction project	Plan is evaluated for safety management, site issues, and safety project specifics	100% achieved a 70% or better	YES

SLO #3	Create a construction safety plan		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.15	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expec. 6 Met Expectations 4 Exceeded Expectations	YES

SLO #4	Create construction project cost estimates			Direct Assessment	
COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
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
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	75% achieved a 75% or better	YES
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	84.4% achieved a 75% or better	YES
CONM 211 Construction Estimating I	Test - Internal	Complete a bid proposal	Final exam with QTO of 2 work categories, analysis of sucontractor quotes, prepare an estimate and bid proposal form	100% achieved a 75% or better	YES
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	97% achieved a 75% or better	YES
CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Create an estimate using Excel	Create an estimate program for building concrete components utilizing advnced commands	87% achieved a 70% or better	YES
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.	96% achieved a 70% or better	YES
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
CONM 499 Construction Project Management	Test - Internal	General estimating knowledge	General estimating development questions applicable to all building types	100% achieved a 70% or better	YES

COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
CONM 499 Construction Project Management	Written Product	Prepare a project cost estimate as part of a student team	Estimate includes total cost, material and labor pricing; overhead; profit and CM fee; and productivity	100% achieved a 70% or better	YES

SLO #4	Create construction project cost estimates		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.24	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	0.5 Marginally Met Exp. 4.5 Met Expectations 6 Exceeded Expectations	YES

SLO #5	Create construction project schedules			Direct Assessment	
COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
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 determien the maximum activity duration	91.7% achieved a 75% or better	YES
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*
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
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 scheduel with a network logic diagram and a project bar chart	88.9% achieved a 75% or better	YES
CONM 499 Construction Project Management	Test - Internal	Explain planning and scheduling projects, preconstruction planning	Explain basic schedule components, schedule calculations, and explain what is included in preconstruction planning	100% achieved a 70% or better	YES
CONM 499 Construction Project Management	Written Product	Prepare a project schedule as part of a student team	Create a schedule for the project and depict the critical path, schedule summary, and a full schedule view	100% achieved a 70% or better	YES

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

SLO #5	Create construction project schedules		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.03	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Exp. 2 Met Expectations 8 Exceeded Expectations	YES

SLO #6	Analyze professional decisions based on ethical principles			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
CONM 211 Construction Estimating I	Test - Internal	Identify ethical issues in bidding scenarios	Select the appropriate ethhical response to a situation	87.5% achieved a 75% or better	YES
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
CONM 424 Safety & Management	Assignment	Analyze a current case study highlighting ethical issues regarding safety	Describe an ethical dilemna, 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
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
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
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 #6	Analyze professional decisions based on ethical principles		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.56	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	4 Met Expectations 7 Exceeded Expectations	YES

SLO #7	Analyze construction documents for planning and management of construction processes			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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	72% achieved a 70% or higher	YES
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	91.7% achieved a 75% or better	YES
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	100% achieved a 70% or better	YES
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
CONM 499 Construction Project Management	Test - Internal	Analyze construction documents to plan and manage the construction process	Complete a site logistics summary for the project	97% achieved a 70% or better	YES

SLO #7	Analyze construction documents for planning and management of construction processes		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.29	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expect. 5 Met Expectations 5 Exceeded Expectations	YES

SLO #8	Analyze methods, materials, and equipment used to construct a project			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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
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
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
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
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	72% achieved a 70% or better on all 3 tests	YES
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
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	98% achieved a 70% or better	YES
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 incude a bill of materials required	85% achieved a 70% or better	YES
CONM 321 Construction Estimating II	Assignment	Determine material component, unit costs, and cost assemblies costs	Determine the unit cost for a foundation wall assemblyusign R.S. Means	78.8% achieved a 75% or better	YES

COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
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)	78.8% achieved a 75% or better	YES
CONM 462 Power and Process Plant Construction	Assignment	Determine the crane and site logistics for a power plant construction project	Student groups evaluated the risks associated with a construction site with each student representing a different role in the consruction process (e.g. construction manager, subcontractor, public, and local government). Each student wrote the risk assessment from their role's viewpoint	95% achieved a 70% or better	YES

SLO #8	Analyze methods, materials, and equipment used to construct a project		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.71	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	2 Marginally Met Expect. 2 Met Expectations 7 Exceeded Expectations	YES

SLO #9	Apply construction management skills as a member of a multi-disciplinary team			Direct Assessment	
COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
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
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 consruction 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
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 #9	Apply construction management skills as a member of a multi-disciplinary team		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.44	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	4 Met Expectations 7 Exceeded Expectations	YES

SLO #10	Apply electronic-based technology to manage the construction process			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
BCTM 217 Virtual Design and Construction	Assignment	Use BIM models of a building and site to extract information	Course will be new in Spring 2019	NA	NA
BCTM 217 Virtual Design and Construction	Test - Internal	Use BIM models of a building and site to extract information	Course will be new in Spring 2019	NA	NA
BCTM 217 Virtual Design and Construction	Assignment	Use BIM models of a building and site to extract information	Course will be new in Spring 2019	NA	NA
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
CONM 117 Construction Building Information Technology	Test - Internal	Explain how BIM is used in the industry	Final exam	90% achieved a 70% or better	YES
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.	74% achieved a 70% or better	YES
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	93.8% achieved a 75% or better	YES
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
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	97% achieved a 70% or better	YES

COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2018)	CRITERION MET?
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	96% achieved a 70% or better	YES
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
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
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 #10	Apply electronic-based technology to manage the construction process		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.82	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	0.25 Marginally Met Exp. 5 Met Expectations 5.75 Exceeded Expect.	YES

SLO #11	Apply basic surveying techniques for construction layout and control			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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
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	95% achieved a 70% or better	YES
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	88% achieved a 70% or better	YES
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	93% achieved a 70% or better	YES
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	69% 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 #11	Apply basic surveying techniques for construction layout and control		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.83	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expect. 4 Met Expectations 3 Exceeded Expectations 3 Not Applicable	YES

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	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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	83.3% achieved a 75% or better	YES
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	90% achieved a 70% or better	YES
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
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 #12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.56	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expect. 5 Met Expectations 5 Exceeded Expectations	YES

SLO #13	Understand construction risk management			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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"	90% achieved a 70% or better	YES
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 consruction 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
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 #13	Understand construction risk management		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.88	YES
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expect. 6 Met Expectations 4 Exceeded Expectations	YES

SLO #14	Understand construction accounting and cost control			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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	81.3% achieved a 75% or bettter	YES
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 dost for a specific item	94.4% achieved a 75% or better	YES
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	90.9% achieved a 75% or better	YES
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	90.9% achieved a 75% or better	YES

SLO #14	Understand construction accounting and cost control		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	6.94*	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Marginally Met Expect. 8 Met Expectations 2 Exceeded Expectations	YES

*Construction Accounting is taught by the College of Business. The Program will meet with a group of students to determine where they believe the course is falling short. The Program will then meet with the instructor(s) to review how the course could be revised

SLO #15	Understand construction quality assurance and control			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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 vlumetrics and proposed mix designs, test trial batches and compare test results to given criteria	82% achieved a 70% or better	YES
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 certifcations achieved.	81.3% achieved a 75% or better	YES
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	
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 #15	Understand construction quality assurance and control		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.59	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	6 Met Expectations 5 Exceeded Expectations	YES

SLO #16	Understand construction project control processes			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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	94.4% achieved a 75% or better	YES
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	94.4% achieved a 75% or better	YES
CONM 499 Construction Project Management	Test - Internal	Identify project control techniques	Determine appropriate responses and timing for project situations	100% will achieve a 70% or better	YES
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% will achieve a 70% or better	YES

SLO #16	Understand construction project control processes		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.29	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	7 Met Expectations 3 Exceeded Expectations 1 Not Applicable	YES

SLO #17	Understand the legal implications of contract, common, and regulatory law to manage a construction project			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
CONM 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, liens, tort law, closeout, dispute resolution, ethics	97% achieved a 70% or better	YES
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 #17	Understand the legal implications of contract, common, and regulatory law to manage a construction project		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.09	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	2 Marginally Met Expect. 7 Met Expectations 2 Exceeded Expectations	YES

SLO #18	Understand the basic principles of sustainable construction			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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 bettter	YES
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	87% achieved a 70% or better	YES

SLO #18	Understand the basic principles of sustainable construction		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.88	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	6 Met Expectations 5 Exceeded Expectations	YES

SLO #19	Understand the basic principles of structural behavior			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
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
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	80.3% achieved a 70% or greater	YES
CONM 221 Statics & Structures	Test - Internal	Apply structural analysis and design methods for different construction materials	Caalculate resultant forces, beam end reactions, truss forces, the centroid of a shape, shear diagram for a beam	81% achieved a 70% or better	YES
CONM 311 Foundations & 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
CONM 311 Foundations & Temporary Structures	Project (Group)	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 incude a bill of materials required	85% achieved a 70% or better	YES
CONM 463 Infrastructure Construction	Test - Internal	Analyze structural behavior of infrastructure construction	Course will be new in Fall 2020	NA	NA

SLO #19	Understand the basic principles of structural behavior		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	8.44	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	9 Met Expectations 2 Exceeded Expectations	YES

SLO #20	Understand the basic principles of mechanical, electrical, and piping systems			Direct Assessment	
COURSE #	**METHOD**	**ASSESSMENT**	**ASSESSMENT METHOD**	**LATEST RESULTS (2018)**	**CRITERION MET?**
BCTM 234 Electrical Construction Practices	Test - Internal	Explain the basic principles of construction electrical systems	Course will be new in Spring 2019	NA	YES
BCTM 235 Mechanical Construction Practices	Test - Internal	Explain the basic principles of construction mechanical systems	Course will be new in Fall 2018	NA	YES
CETM 227 Hydraulics and Hydrology	Test - Internal	Perform hydrodynamic calculations on fluids in open and closed conduits		80% achieved a 70% or better	YES
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
CONM 463 Infrastructure Construction	Test - Internal	Describe the main components of MEP systems in civil projects	Course will be new in Fall 2020	NA	YES

SLO #20	Understand the basic principles of mechanical, electrical, and piping systems		Indirect Assessment	
Graduating seniors survey	On a scale of 1-10 with 10 indicating the program's curriculum meets the SLO perfectly and 0 indicating a failure by the program's curriculum to meet the SLO	Must achieve an average score of 7 to be meeting the program's established standard for meeting the SLO	7.88	NO
Industry Advisory Board	Evaluated as "did not meet expectations, marginally met expectations, met expectations, exceeded expectations"	Must at least marginally meet expectations	1 Did Not Meet Expect. 2 Marginally Met Expect. 4 Met Expectations 3 Exceeded Expectations 1 Not Applicable	YES