

# 2014-2015 LONG SIGNATURE SHEET

Proposal Number: ETCM 10-16-14

Proposal Title: Modification to the Master of Science in Construction and Facilities Management

Originating Department: Engineering Technology and Construction Management



**UNC CHARLOTTE**

TYPE OF PROPOSAL: UNDERGRADUATE \_\_\_\_\_ GRADUATE  UNDERGRADUATE & GRADUATE \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
10/24/14	10/24/14	10/24/14	Approved	<u>DEPARTMENT CHAIR</u>  [print name here:] Anthony Brizendine
			Approved	<u>COLLEGE CURRICULUM COMMITTEE CHAIR</u>  [print name here:] Tao Hong
			Approved	<u>COLLEGE FACULTY CHAIR (if applicable)</u>  [print name here:] MANUREKAR MADHAV
11/11/14	11/11/14		Approved	<u>COLLEGE DEAN</u>  [print name here:] Robert Johnson
			Approved	<u>GENERAL EDUCATION</u> (if applicable; for General Education courses) [print name here:]
			Approved	<u>HONORS COLLEGE</u> (if applicable; for Honors courses & programs) [print name here:]
			Approved	<u>UNDERGRADUATE COURSE &amp; CURRICULUM COMMITTEE CHAIR</u> (for undergraduate content)
11-18-14	12-2-14	12-16-14	Approved	<u>GRADUATE COUNCIL CHAIR</u> (for graduate content)  ALAN R. FREITAG
				<u>FACULTY GOVERNANCE ASSISTANT</u> (Faculty Council approval on Consent Calendar)
				<u>FACULTY EXECUTIVE COMMITTEE</u> (if decision is appealed)



**UNC CHARLOTTE**

**LONG FORM  
COURSE AND CURRICULUM PROPOSAL**

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\*To: Dr. Alan Freitag, Graduate Council Chair

From: Dr. John Hildreth

Date: 17Oct14

Re: Modifications to Master of Science in Construction and Facilities Management

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Please find the attached proposal to modify the Master of Science in Construction and Facilities Management program.

University of North Carolina at Charlotte

ETCM 10-16-14

Revised Graduate

Course and Curriculum Proposal from Department of Engineering Technology and Construction Management

**Modification to the Master of Science in Construction and Facilities Management**

**II. CONTENT OF PROPOSALS**

**A. PROPOSAL SUMMARY**

The Department of Engineering Technology and Construction Management proposes to create two new courses, revise the number of one existing course, and appropriately revise the MSCFM catalog description. The purpose of the proposed changes is to facilitate cross-listing of courses with appropriate 4000-level courses. The proposed new courses are:

- a. CMET 5126 Project Scheduling and Control – to be cross-listed with CMET 4126
- b. CMET 5350 Construction Geotechnics and Foundations. – to be cross-listed with CMET 4350

The existing CMET 5130 Building Information Modeling course is proposed to be renumbered as CMET 5135 to be cross listed with CMET 4135.

**B. JUSTIFICATION**

**1. Identify the need addressed by the proposal and explain how the proposed action meets the need.**

The need addressed by this proposal is to increase the breadth of course topics available to MSCFM students and to provide opportunity for students to tailor their plan of study in support of their interests and research.

- i. The creation of two new courses will increase educational opportunities for students and incorporate contemporaneous topics related to construction and facilities management.
- ii. The list of elective courses in the catalog will include the courses proposed herein.
- iii. Renumbering of the CMET 5130 course will create the opportunity to cross-list the course with a similarly numbered 4000 level course.
- iv. Revision of the MSCFM catalog description will update the list of graduate faculty and list of elective courses to reflect the proposed changes.

**2. Discuss prerequisites/corequisites for course(s) including class-standing, admission to the major, GPA, or other factors that would affect a student's ability to register.**

The proposed courses do not have prerequisite/corequisite requirements.

**3. Demonstrate that course numbering is consistent with the level of academic advancement of students for whom it is intended.**

The UNC Charlotte course numbering guidelines have been followed for the proposed courses and are appropriate for graduate level coursework.

**4. In general, how will this proposal improve the scope, quality and/or efficiency of programs and/or instruction?**

The proposed changes will enhance the quality of the MSCFM program. The increased scope of course offerings will attract prospective students and the flexibility to tailor the plan of study will improve the efficiency and quality of student research.

**5. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.**

The proposed courses have not been previously offered as special topic courses. The courses will be cross-listed with the CMET 4126 and ETCE 4350 courses existing in the undergraduate Construction Management curriculum.

- C. **IMPACT.** Changes to courses and curricula often have impacts both within the proposing department as well as campus-wide. What effect will this proposal have on existing courses and curricula, students, and other departments/units? Submit an Impact Statement that fully addresses how you have assessed potential impacts and what the impacts of this proposal might be. Consider the following:

1. **What group(s) of students will be served by this proposal? (Undergraduate and/or graduate; majors and/or non-majors, others? Explain). Describe how you determine which students will be served.**

The primary audience for the proposed courses is MSCFM students. The proposed courses are available to engineering graduate students.

2. **Effect on existing courses and curricula**  
a. **When and how often will added course(s) be taught?**

The proposed courses will be offered on-demand. The courses will be offered on demand.

- b. **How will the content and/or frequency of offering of other courses be affected?**

The content and scheduling of other courses will not be affected.

- c. **What is the anticipated enrollment in course(s) added (for credit and auditors)?**

Enrollment in the proposed courses is anticipated to be 15 to 20 students.

- d. **How will enrollment in other courses be affected? How did you determine this?**

The enrollment in other courses is not expected to be greatly affected. The number of courses offered each semester will remain at 4 to 5 courses.

- e. **Identify other areas of catalog copy that would be affected, including within other departments and colleges (e.g., curriculum outlines, requirements for the degree, prerequisites, articulation agreements, etc.)**

The catalog copy of other departments and colleges will not be affected.

### III. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

- A. **PERSONNEL.** Specify requirements for new faculty, part-time teaching, student assistants and/or increased load on present faculty. List by name qualified faculty members interested in teaching the course(s).

No new personnel resources are required to implement the proposed changes. The following faculty have expressed interest and are qualified to teach the proposed courses:

- a. CMET 5126 Project Scheduling and Control – Dr. John Hildreth  
b. CMET 5350 Construction Geotechnics and Foundations – Dr. Anthony Brizendine

- B. **PHYSICAL FACILITY.** Is adequate space available for this course?

The ETCM department has adequate classroom and laboratory space to implement these proposed changes.

- C. **EQUIPMENT AND SUPPLIES:** Has funding been allocated for any special equipment or supplies needed?

No special equipment or supplies are required to implement these proposed changes.

- D. **COMPUTER.** Specify any computer usage (beyond Moodle) required by students and/or faculty, and include an assessment of the adequacy of software/computing resources by available for the course(s).

The existing Mosaic computing system is adequate for implementation of these proposed changes.

- E. **AUDIO-VISUAL**. If there are requirements for audio-visual facilities beyond the standard classroom podiums, please list those here.

Audio-visual equipment and facilities are adequate to support the implementation of these proposed changes.

- F. **OTHER RESOURCES**. Specify and estimate cost of other new/added resources required, e.g., travel, communication, printing and binding.

No other resources are required to implement these proposed changes.

- G. **SOURCE OF FUNDING**. Indicate source(s) of funding for new/additional resources required to support this proposal.

No new/additional resources are required.

#### IV. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

- A. **LIBRARY CONSULTATION**. Indicate written consultation with the Library Reference Staff at the departmental level to ensure that library holdings are adequate to support the proposal prior to its leaving the department.

A copy of the library consultation is attached.

- B. **CONSULTATION WITH OTHER DEPARTMENTS OR UNITS**. List departments/units consulted in writing regarding all elements outlined in IIC: Impact Statement, including dates consulted. Summarize results of consultation and attach correspondence. Provide information on voting and dissenting opinions (if applicable).

The MSCFM Program is fully autonomous and consultation with other departments or units was unnecessary.

- C. **HONORS COUNCIL CONSULTATION**. In the case of Honors courses or Honors programs indicate written consultation with the Honors Council (if applicable).

N/A

#### V. INITIATION, ATTACHMENTS AND CONSIDERATION OF THE PROPOSAL

- A. **ORIGINATING UNIT**. Briefly summarize action on the proposal in the originating unit including information on voting and dissenting opinions.

Discussion of the proposed modifications were initiated by the MSCFM faculty at the September 23, 2014 FAIT meeting. A draft proposal was presented and unanimously approved by the MCSFM faculty on October 9, 2014. The proposal was unanimously approved by the ETCM faculty at the departmental meeting held October 16, 2014.

- B. **CREDIT HOUR**. (Mandatory if new and/or revised course in proposal). Review statement and check box once completed:

The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a [credit hour](#).

- C. **ATTACHMENTS**.

1. **CONSULTATION**: Attach relevant documentation of consultations with other units.

Consultation with other departments or units was unnecessary.

2. **COURSE OUTLINE/SYLLABUS**: For undergraduate courses attach course outline(s) including basic topics to be covered and suggested textbooks and reference materials with dates of publication. For Graduate Courses attach a course syllabus. Please see [Boiler Plate for Syllabi for New/Revised Graduate Courses](#).

Outlines/syllabi for proposed courses are attached.

3. **PROPOSED CATALOG COPY:** Copy should be provided for all courses in the proposal. Include current subject prefixes and course numbers, full titles, credit hours, prerequisites and/or corequisites, concise descriptions, and an indication of when the courses are to be offered as to semesters and day/evening/weekend. Copy and paste the current catalog copy and use the Microsoft Word “track changes” feature (or use red text with “~~strikethrough~~” formatting for text to be deleted, and adding blue text with “underline” formatting for text to be added).

a. For a new course or revisions to an existing course, check all the statements that apply:

- This course will be cross listed with another course.  
 There are prerequisites for this course.  
 There are corequisites for this course.  
 This course is repeatable for credit.  
 This course will increase/decrease the number of credits hours currently offered by its program.  
 This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

**Current 2014-2015 Graduate Catalog:****Construction and Facilities Management**

- M.S. in Construction and Facilities Management

**Department of Engineering Technology and Construction Management**

et.uncc.edu

**Department Chair and Graduate Program Director**~~Dr. Anthony L. Brizendine~~[Dr. John Hildreth](#)**Graduate Faculty**

Anthony L. Brizendine, PhD, PE, Professor

[Aidan Browne, PhD, Assistant Professor](#)

Nan Byars, PE, Professor

Tara Cavalline, PhD, PE, Assistant Professor

Don Chen, PhD, LEED AP, Assistant Professor

~~Chung Suk Cho, PhD, Assistant Professor~~

G. Bruce Gehrig, PhD, PE, Associate Professor

Rodney Handy, PhD, Professor

John Hildreth, PhD, ~~Assistant~~ [Associate](#) Professor~~Parminder Juneja, PhD, Assistant Professor~~

Hyunjoo Kim, PhD, Assistant Professor

Jeff Kimble, Associate Professor

Steve Kuyath, PhD, Associate Professor

Na Lu, Ed.D., AIC, Assistant Professor

David Murphy, Associate Professor

Thomas Nicholas, PhD, PE, Assistant Professor

Maciej Noras, PhD, Associate Professor

[Demba Ndiaye, PhD, Assistant Professor](#)

Carlos Orozco, PhD, PE, Associate Professor

Peter Schmidt, PhD, PE, Associate Professor

Deborah Sharer, PhD, Associate Professor

Barry Sherlock, PhD, Professor

Patty Tolley, PhD, PE, Associate Professor

Nicholas Tymvios, PhD, Assistant Professor

Jozef Urbas, PhD, Associate Professor

Sheng-Guo Wang, PhD, Professor

Wesley Williams, PhD, Assistant Professor

Aixi Zhou, PhD, Associate Professor

**M.S. IN CONSTRUCTION AND FACILITIES MANAGEMENT**

Construction Management is a program that prepares individuals to manage, coordinate, and supervise the construction process from concept development through project completion on timely and economic bases. Such programs include instruction in commercial, residential, mechanical, highway/heavy civil, electrical, environmental, industrial, and specialty construction; facilities management; project planning; budgeting and cost control; logistics and materials management; personnel management and labor relations; site safety; construction contracting; construction processes and techniques; organization and scheduling; and applicable codes and regulations.

Facility Management is a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology. The body of knowledge required for facility management degree programs includes facility function (professional practice), human and environmental factors, planning and project management, finance, operation and maintenance, real estate, written and oral communication, information technology, quality management and assessment procedures (research and analytical methods), and integrative and problem solving skills.

Construction and facility management professionals work with owners, engineers, architects, specialty and sub-contractors, government agencies, and others to deliver, operate and maintain constructed projects and facilities. This MSCFM program provides the advanced professional development and graduate education necessary for construction and facility management professionals to work in the increasing high tech, rapidly changing construction industry and related careers such as real estate and land development, infrastructure development, code enforcement, and insurance. The program also has a special relationship with and focus on sustainability and energy infrastructure as part of the Energy Production and Infrastructure Center (EPIC) and Innovative Design, Engineering, and Sustainability (IDEAS) Center initiatives at UNC Charlotte.

### **Application Deadline**

Applications can be received by the Graduate Admission Office any time prior to the published deadlines. In order to be considered for assistantships and tuition grants for the following academic year, students should apply by March 1 for priority consideration. The first round of award decisions typically occurs by March 15. However, the Department will evaluate admission applications at any time complete applications are received by the Graduate School.

### **Assistantships**

Research and teaching assistantships are available from the Department on a competitive basis to highly qualified applicants/students.

### **Tuition Grants**

Tuition grants, including out-of-state tuition differential waivers and in-state tuition support, are available on a competitive basis for both out-of-state and in-state students, respectively.

### **Admission Requirements**

Admission requirements are found at <http://graduateschool.uncc.edu/future-students/admissions>.

### **Documents to be Submitted for Admission**

- a. Official transcripts from all colleges and universities attended
- b. Official GRE scores
- c. Official TOEFL scores
- d. The UNC Charlotte application for graduate admission online
- e. Three professional recommendations
- f. Others as required by the Graduate School

### **Degree Requirements**

The program leading to the Master of Science degree in Construction and Facilities Management is a 30 semester-hour program. The program consists of a 9 credit hour common core and a capstone experience including either a non-research focused sequence of 21 credit hours of electives or a research focused sequence of 15-credit hours of electives with a formal 6-credit hour graduate research thesis and completion of the 3-credit hour CMET 6160 Research and Analytical Methods course. At least 15 semester hours must be in courses numbered 6000 or above. The 30-credit hour degree program is outlined below:

#### **Required Common Construction / Facilities Management Core Courses (9 hours)**

CMET 6135 Advanced Construction Planning and Management (3)  
 CMET 6240 Safety and Risk Management (3)  
 CMET 6270 Operation of Constructed Facilities (3)

#### **Capstone Options (21 hours)**

*(Students select one of the following)*

1. Non-Thesis Option (21 credit hours)
  - Major Elective (21 credit hours total)
2. Thesis and Research Option (6 credit hours)
  - CMET 6160 Research and Analytical Methods (3)
  - Major Electives (12 credit hours total)
  - CMET 6900 Master's Thesis & Research (6)



## Electives

*(Students select from the following or others with director approval)*

[CMET 5126 Project Scheduling and Control \(3\)](#)  
 CMET 5130 Building Information Modeling (3)  
 CMET 5140 Building Energy Management (3)  
 CMET 5150 Green Building (3)  
 CMET 5160 Advanced Construction Materials (3)  
 CMET 5290 Temporary Structures in Construction (3)  
[CMET 5350 Construction Geotechnics and Foundations \(3\)](#)  
 CMET 6000 Special Topics in Construction and Facilities Management (3)  
 CMET 6145 Facilities Management Financial Analysis (3)  
 CMET 6155 Facility Instrumentation and Controls (3)  
 CMET 6160 Research and Analytical Methods (3)  
 CMET 6165 Transportation Asset Management (3)  
 CMET 6180 Alternative Project Delivery Methods (3)  
 CMET 6250 Asset Management for Facility Managers (3)  
 CMET 6255 Advanced Plant Layout and Design (3)  
 CMET 6275 Advanced Construction Means and Methods (3)  
 CMET 6285 Quality Assurance in Construction (3)  
 CMET 6295 Design and Improvement of Construction Operations (3)  
 CMET 6800 Independent Study in Construction and Facilities Management (3)  
 ENER 5250 Analysis of Renewable Energy Systems (3)  
 ENER 5275 Air Conditioning Systems (3)  
 ENER 5285 Applied Noise and Vibration Control (3)  
 ENER 6120 Energy Generation and Conversion (3)  
 ENER 6135 Energy Transmission & Distribution (3)  
 ENER 6150 System Dynamics (3)  
 ENER 6170 Applied Mechatronics (3)  
 ENER 6220 High Voltage Technology (3)  
 ENER 6250 Advanced Instrumentation (3)  
 ETGR 5272 Advanced Engineering Analysis (3)

Additional new major elective courses may be created based on industry needs and faculty research interest. In addition, appropriate existing graduate level courses from other programs may be approved by the program director.

## Capstone Experiences

Students pursuing the Master of Science in Construction and Facilities Management have two options to complete the 30-credit hour program as follows:

1. 24 hours of coursework plus 6 hours of thesis project
2. 30 hours of coursework and a comprehensive examination.

Both options require the formation of a program committee. The thesis option is reserved for students who are attending the on-campus program and are performing research under formal graduate research or teaching assistantships. Students receiving such assistantships may be required to pursue the thesis option. The thesis option requires students to submit a written thesis and orally defend their work before their program committee.

All non-thesis students must complete 30 credits of coursework and successfully complete a formal comprehensive examination. The comprehensive examination is a written exam. A student's exam will be scheduled when he/she has at least 24 hours of course credit completed or in progress. The student's graduate advisor and the examining committee will coordinate the examination (to be offered once in the fall and once in the spring semesters), preparing the exam with the assistance of members of the student's program committee. The exam will measure the student's mastery of theories and applications in the selected area of specialization within the discipline. Students will have only two opportunities to receive passing marks on the examination.

## Advising

Each student is supervised by his/her graduate advisor and a program committee.

### **Plan of Study Requirements**

Each student is required to submit a Plan of Study to the Department's Graduate Director before completing 18 hours of graduate credits.

### **Application for Degree**

Each student should submit an Application for Degree prior to graduation. If a student does not graduate in the semester identified on the Application, the student must complete a new form and repay the application fee to be considered for graduation in a subsequent semester.

### **Transfer Credit**

The Department, at its discretion, may accept transfer of graduate courses (6 credits maximum) taken at another institution or from another program prior to admission to the Master's program in Construction and Facilities Management. Only courses in which the student earned a grade of B or above may be transferred.

### **Grades Requirement**

All candidates must earn an overall 3.0 GPA to graduate. Accumulation of one U grade or three C grades will result in the suspension of the student's enrollment in the program.

### **Other Requirements**

The program has both a thesis and non-thesis track. After admission to candidacy, thesis students will complete a comprehensive oral exam while non-thesis students will complete a comprehensive written exam. Residence will be per Graduate School rules. There is no language requirement. While full-time students will typically take three semesters to complete the program, part-time students are expected to take no more than six years to complete the program as per Graduate School rules.

### **Proposed Catalog Copy of Courses:**

(Only affected course descriptions are listed)

**CMET 5126 Project Scheduling and Control (3)** Methods for planning, scheduling, and controlling construction projects, emphasizing manual and computer based techniques for critical path method scheduling, resource management, construction cost control, and reporting practices. (On demand)

**CMET 51305. Building Information Modeling. (3)** The creation, management, and application of building information models to the construction, operation, and maintenance of a facility. Focus on ~~2D and~~ 3D and 4D computer models of building components, renderings, animations, and interfacing with analysis tools. (On demand)

**ETCE 5350. Construction Geotechnics and Foundations. (3)** Study of the concepts and fundamental principles of construction geotechnics related to foundation engineering / construction excavations, temporary structures, dewatering and slope stability. (On demand)

- b. If overall proposal is for a new degree program that requires approval from General Administration, please contact the [facultygovernance@uncc.edu](mailto:facultygovernance@uncc.edu) for consultation on catalog copy.**

N/A

- 4. ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY): Does the proposed change impact an existing Academic Plan of Study?**
- Yes. If yes, please provide updated Academic Plan of Study in template format.
- No.
- 5. STUDENT LEARNING OUTCOMES (UNDERGRADUATE & GRADUATE): Does this course or curricular change require a change in Student Learning Outcomes (SLOs) or assessment for the degree program?**

Yes. If yes, please provide updated SLOs in template format.

No.

The proposed changes do not affect the established SLOs or assessment for the degree program

- 6. TEXTBOOK COSTS: It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?**

Yes. Briefly explain below.

No. Briefly explain below.

Electronic textbooks, textbook rentals, and the buyback program have been considered in this proposal.

#### **VI. ATTACHMENTS**

1. Attachment A – Graduate Course Descriptions and Syllabi
2. Attachment B – Library Consultation Documentation

## **Attachment A – Graduate Course Descriptions and Syllabi**

## CMET 5126 – Project Scheduling and Control

*Credits: 3*

*Prerequisite/Co-requisites: None*

CMET 5126 Project Scheduling and Control (3) Methods for planning, scheduling, and controlling construction projects, emphasizing manual and computer based techniques for critical path method scheduling, resource management, construction cost control, and reporting practices. (On demand)

### ***Textbooks:***

Construction Planning and Scheduling, 4<sup>th</sup> edition, Jimmie Hinze, Pearson, ISBN 978-0132473989

### ***Course Objectives:***

The course is designed to provide the student with a working knowledge of the concepts, terminology, and methods associated with construction project scheduling and control. Upon successful completion of the course, the student will be able to:

1. Develop a WBS and list of schedule activities, sequence activities for a logical project work flow, and estimate activity durations
2. Develop a resource loaded schedule using a commercially available scheduling software program
3. Update a schedule and report project status in terms of schedule and cost criteria
4. Apply the serial and parallel methods for resource allocation
5. Develop a schedule to meet resource constraints
6. Develop a least cost crash curve for a schedule network
7. Produce a 4D visualization of a project schedule

### ***Instructional Method:***

Two lectures per week, augmented with in-class exercises and assignments. If this course is cross-listed with the CMET 4126 course, assignments for graduate students in the CMET 5126 course will be expanded to include additional tasks related to resource loading the schedule, interpreting and reporting project status, and resource constrained scheduling.

### ***Means of Student Evaluation:***

All work will be evaluated. Final course grades will be assigned on the A through F scale and generally follow:

90 to 100	A
80 to 90	B
70 to 80	C
Less than 70	U

The final course grade will be a weighted aggregation based on the following:

1. 15 percent for average grade on assignments
2. 10 percent for average grade on quizzes
3. 25 percent for Exam 1
4. 25 percent for Exam 2
5. 25 percent for Final Exam

### ***Class Preparation and Assignments:***

- Assignments are considered to be integral to the learning process. They are opportunities to apply concepts, practice techniques learned, and demonstrate mastery of the subject. Assignments will be posted on the course Moodle webpage at least one week prior to the due date. Submitted assignments are to be prepared in a neat and orderly manner. Hand written calculations are to be legible and on engineering paper. Unless otherwise noted, assignments must be accompanied by a transmittal memorandum containing the following information:
  - a. Student name(s)
  - b. Date submitted
  - c. Assignment number

- d. Concise statement of the assignment
  - e. Concise description of the methods used
  - f. Concise summary of the results
- Completed assignments are due in hard copy format at the beginning of class on the date indicated on the current schedule of sessions. Assignments submitted late must be time-stamped and placed in my mailbox (in Smith 245) or submitted to me directly. The grade received for assignments submitted late will be adjusted in accordance with the following:
    - a. Up to 1 day (24 hrs) late – deduct 15 percent
    - b. Up to 2 days (48 hrs) late – deduct 30 percent
    - c. After 2 days (48 hrs) assignments will not be accepted
  - Regular class attendance is strongly encouraged. If a student must be absent, it is the sole responsibility of the student to obtain any and all information provided in the class from others in the class.
  - The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.
  - Exams will be held only on the scheduled dates. No makeup exams will be given. The scheduled exam dates are shown on the Schedule of Sessions and are subject to modification based on the pace of course progress. It is the responsibility of the student to inform the instructor and make arrangements prior to missing any scheduled exam. Failure to do so will result in a grade of zero (0) for the missed exam.

#### ***Academic Integrity***

All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or at <http://legal.uncc.edu/policies/up-407>.

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

#### ***Topical Outline of Course Content (subject to revision):***

1. Intro to Scheduling and Control
2. CPM Calculations Review
3. Work Breakdown Structure
4. Activities and Logic
5. Activity Durations
6. Time/Cost Integration
7. Calendars
8. P6 Inputs/Outputs
9. Scheduling Specifications (Presenting the BL)
10. Time in Contractual Provisions
11. Updating the Schedule
12. Modifying the Schedule
13. Crashing the Schedule
14. Schedule Visualization
15. Resource Allocation
16. Resource Allocation
17. Resource Constrained Scheduling

## CMET 5350 – Construction Geotechnics and Foundations

*Credits: 3*

*Prerequisite/Co-requisites: None*

**ETCE 5350. Construction Geotechnics and Foundations. (3)** Study of the concepts and fundamental principles of construction geotechnics related to foundation engineering / construction excavations, temporary structures, dewatering and slope stability. (On demand)

***Textbooks:***

Principles of Foundation Engineering, 7<sup>th</sup> edition, Das, Cengage, ISBN 978-0-495-66810-7

***Course Objectives:***

The course is designed to provide students with a working knowledge of practical geotechnical design considerations for foundation construction. Upon successful completion of the course, the student will be able to:

1. Describe construction considerations based on review of a geotechnical investigation report.
2. Evaluate advanced soil exploration methods and equipment.
3. Analyze and design shallow foundations.
4. Analyze and design deep foundations, including piles, drilled piers, and caissons.
5. Analyze and design earth retention structures, including retaining walls, sheet pile walls, and tie-back systems.
6. Perform stability analyses of soil slopes.
7. Analyze and design dewatering systems and evaluate uplift pressures using flow nets.
8. Evaluate geosynthetics for specific uses.

***Instructional Method:***

Two lectures per week, augmented with in-class exercises, assignments, and projects. If this course is cross-listed with the ETCE 4350 course, assignments and projects for graduate students in the CMET 5350 course will be expanded to include additional tasks related to the evaluation and design of temporary geotechnical structures in support of construction.

***Means of Student Evaluation:***

All work will be evaluated. Final course grades will be assigned on the A through F scale and generally follow:

90 to 100	A
80 to 90	B
70 to 80	C
Less than 70	U

The final course grade will be a weighted aggregation based on the following:

1. 10 percent for average grade on assignments
2. 15 percent for the project
3. 25 percent for Exam 1
4. 25 percent for Exam 2
5. 25 percent for Final Exam

***Class Preparation and Assignments:***

- All assignments are due on the announced date, and no late submissions will be accepted.
- If a student must be absent, it is the student's responsibility to obtain materials from the missed lecture from others in the class.
- Cell phones, music players, and other similar electronic devices are not allowed during class. Laptops and electronic tablets may be used during class for taking notes, however, wireless and internet connections must be turned off. Repeated misuse of electronic devices will result in a student being administratively dropped from the course.

***Academic Integrity***

All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or at <http://legal.uncc.edu/policies/up-407>.

*Topical Outline of Course Content (subject to revision):*

1. Subsurface Investigations and Geotechnical Report Planning/Interpretation
2. Lateral Earth Pressure (Rankine vs. Coulomb)
3. Earth Retention Structures
4. Sheetpile structures
5. Mechanically Stabilized Earthen Retaining Wall
6. Anchored Bulkheads and Tie-Back Walls
7. Safety Factors for an Anchored Bulkhead System
8. Slope Stability Analysis
9. Bearing Capacity and Shallow Footing Foundations
10. Deep Pile Foundations
11. Drilled Piers and Caissons
12. Flow Nets and Seepage Analysis
13. Dewatering Methods
14. Soil Improvement Techniques
15. Geosynthetics in Construction



## Attachment B – Library Consultation Documentation



J. Murrey Atkins Library

### Consultation on Library Holdings

**To:** John Hildreth  
**From:** Jeff McAdams  
**Date:** 10/14/14  
**Subject:** Modification to the Master of Science in Construction and Facilities Management

#### Summary of Librarian's Evaluation of Holdings:

**Evaluator:** Jeff McAdams      **Date:** 10/14/14

#### Check One:

1. Holdings are superior \_\_\_\_\_
2. Holdings are adequate   x
3. Holdings are adequate only if Dept. purchases additional items. \_\_\_\_\_
4. Holdings are inadequate \_\_\_\_\_

#### Comments:

Library holdings should be adequate to support student research for this course (see list of items held by subject heading below). Students will have access to relevant databases including *Engineering Village*, *Science Direct*, *Web of Science*, *Business Source Complete*, *ASCE Digital Library*, *CRC ENGnetBASE*, and many others.

LC Subject Heading	Books	Journals
Project Management	628	8
Building Superintendence	28	0
Soil Mechanics	333	21
Foundations (Construction)	37	2
Building Information Modeling	8	0

\_\_\_\_\_  
 Evaluator's Signature

10/14/14

\_\_\_\_\_  
 Date