A. Proposal Summary and Catalog Copy

1. Summary

The Department of Engineering Technology proposes the establishment of a Bachelor of Science in Construction Management (BSCM). The proposed program will be closely aligned with and share many resources of the existing Civil Engineering Technology (CIET) program; hence, concurrent revisions to the CIET curriculum are also required to align both programs with specialized accreditation requirements. As a consequence, both the new construction management (CMET) program and the revisions to the CIET program have been addressed in this course and curriculum proposal.

The following new undergraduate seminar courses will be created to support both Civil Engineering Technology and Construction Management: CMET 1680, 2680, 3680, and 4680.

The following new required undergraduate courses in construction management (CMET) will be created: CMET 3224, CMET 4125, CMET 4228, and CMET 4272.

The following new required undergraduate laboratory courses in CIET will be created: ETCE 3163L and ETCE 3271L.

The following elective courses will be created: ETCE 4073, ETCE 4344, CMET 4073 and CMET 4127.

In addition, as part of the proposal, minor changes will be made to some course descriptions. In addition to revisions in course numbering, minor changes will be made to several of the course descriptions. Some courses include revised course prerequisites, however, additional minor changes to the titles and/or descriptions are being proposed for several courses. Revised descriptions and prerequisites are provided herein. Course numbering will be modified for the following existing courses to reflect a consistent numbering sequence in the program:

<table>
<thead>
<tr>
<th>Revised Course Number</th>
<th>Former Course Number</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETCE 3123</td>
<td>ETCE 3281</td>
<td>Cost Estimating</td>
</tr>
<tr>
<td>ETCE 3131</td>
<td>ETCE 3121</td>
<td>Foundations &amp; Earthwork</td>
</tr>
<tr>
<td>ETCE 3131L</td>
<td>ETCE 3151</td>
<td>Soil Testing Laboratory</td>
</tr>
<tr>
<td>ETCE 3163</td>
<td>ETCE 3111</td>
<td>Structural Analysis &amp; Design</td>
</tr>
<tr>
<td>ETCE 3271</td>
<td>ETCE 3293</td>
<td>Building Systems</td>
</tr>
<tr>
<td>ETCE 3242</td>
<td>ETCE 3132</td>
<td>Hydraulics &amp; Hydrology</td>
</tr>
</tbody>
</table>
2. Proposed Catalog Copy for Construction Management Courses

CMET 1680. Professional Development I. (1) Prerequisite: Open to freshman level Civil Engineering Technology and Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

CMET 2680. Professional Development II. (1) Prerequisite: Open to sophomore level Civil Engineering Technology and Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

CMET 3224. Construction Project Administration. (3) Prerequisite: Junior Standing or AAS degree. A study of the project management processes used in the design and construction of civil engineering projects. Topics include the roles and responsibilities of project participants, project delivery methods, engineering and construction contracts, project control and documentation, and dispute resolution mechanisms. (Spring)

CMET 3680. Professional Development III. (1) Prerequisite: Open to junior level Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

CMET 4073. Special Topics – Construction Management. (1-4) Prerequisite: senior standing and consent of instructor. A study of new and emerging technical topics pertinent to the field of construction management. May be repeated for credit. (On demand)

CMET 4125. Construction Codes and Contract Documents. (2) Prerequisites: Junior Standing or AAS degree. An analysis of construction contract documents, building codes, permits, and specifications. (Fall)
CMET 4127. Construction Law and Regulatory Issues. (3) Examination of the legal problems encountered by architects, engineers, contractors, owners, sureties, and lenders involved in the construction process. Special emphasis on the legal rights and liabilities of the various participants in construction projects. Claims preparation, negotiation, arbitration, and litigation methods of dispute resolution. (On demand)

CMET 4228. Construction Office Operations. (2) Prerequisite: CMET 3224. A study of management issues encountered in home and job-site office operations. Topics include construction safety, insurance and risk management, labor relations, procurement, cost accounting, subcontracting, and labor and equipment resource allocation and management. (Spring)

CMET 4272. Capstone Project. (2) (W,O) Prerequisite: Senior standing in Construction Management and consent of the Department. Utilization of students’ previous course work to creatively investigate and produce solutions for a comprehensive construction management project. (Spring)

CMET 4680. Professional Development IV. (1) Prerequisite: Open to senior level Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

3. Proposed Catalog Copy for Civil Engineering Technology Courses

ETCE 1121. Construction Methods. (3) An introduction to the basic construction methods and operations used on civil engineering projects. Topics include basic construction and civil engineering terminology, identification and selection of construction equipment and techniques, and an overview of the components and processes used in the construction of concrete, steel, and wood-framed structures. (Fall)

ETCE 1211. Surveying I. (3) Prerequisite or Corequisite: MATH 1103. An introductory field surveying and site planning course covering standards, units, and calibration of equipment, measurement of distance, elevation, angles, and analysis of systematic and random errors in the measurement, adjustments of measurements, weighting, and principle of least squares. Two hours of lecture and three hours of laboratory per week. (Spring)

ETCE 1222. Construction Materials. (3) Study of the behavior and physical properties of basic construction materials. Topics include mineral aggregates, Portland cement concrete, masonry, wood, asphalt concrete, metals, plastics, and other materials. Two hours of lecture and three hours of laboratory per week. (Spring)

ETCE 2112. Construction Surveying and Layout. (3) Prerequisites: CMET 1211, ETGR 1103. An intermediate surveying and site-planning course covering plane survey, design and layout of horizontal and vertical curves, direction and traversing, design of
site plant, control of grading, and global positioning system. Two hours of lecture and three hours of laboratory per week. (Fall)

**ETCE 2410. Introduction to Environmental Engineering Technology. (3)** Prerequisites: MATH 1103, ETGR 1201. This course is designed to serve as an introduction to environmental engineering technology. The course will provide an overview of the environmental field to include laws and regulations, water quality, hydraulic and hydrologic fundamentals, water and wastewater treatment, groundwater contamination, and solid waste management. (Spring)

**ETCE 3123. Cost Estimating. (3)** Prerequisites: ETCE 1222, ETCE 2112 or AAS degree or Departmental approval. Methods used to determine material quantities, labor and equipment requirements, and costs associated with construction activities and projects. (Fall)

**ETCE 3131. Foundations and Earthwork. (3)** Prerequisite: ETGR 2101 or AAS degree. Study of basic design and construction of foundations. Background theories are generally introduced in concise forms as formulas or charts. Emphasis on practical aspects of foundation design and earthwork construction. (Fall)

**ETCE 3131L. Soil Testing Laboratory. (1) (W)** Prerequisite or Corequisite: ETCE 3131. Laboratory designed to familiarize the student with the common laboratory soil tests and analysis procedures with emphasis on the significance of the various tests, the testing procedures and the detailed computations. Three laboratory hours per week. (Fall)

**ETCE 3163. Structural Analysis and Design I. (3)** Prerequisite: ETGR 2102 or AAS degree. Basic concepts and principles of structural analysis and design. Emphasis on practical aspects of structural analysis and design to include beams, columns, trusses, frames, and temporary structures for construction projects. (Fall)

**ETCE 3163L. Structures and Materials Laboratory. (1) (W)** Prerequisite or Corequisite: ETCE 3163. Laboratory designed to evaluate structural materials commonly encountered in the civil and construction environments. Basic beam, truss and frame experiments will be conducted. Standard laboratory and field tests for typical materials such as block, brick, asphalt, concrete, steel and timber will be performed. Three laboratory hours per week. (Fall)

**ETCE 3242. Hydraulics & Hydrology. (3)** Prerequisites: ETGR 2102, ETCE 2410 or AAS degree. A study of the fundamental principles of hydraulics and their application in engineering practice, including the fundamentals of fluid flow through orifices, tubes and pipes, in open channels, and over weirs, pump design, network analysis, and modeling. (Spring)

**ETCE 3242L. Hydraulics Laboratory. (1) (W)** Prerequisite or Corequisite: ETCE 3242. Laboratory designed to provide the student with an understanding of the apparatus, techniques, and procedures used to measure hydraulic fluid properties and to verify the
fundamentals of fluid flow through orifices, tubes and pipes, in open channels, and over weirs. Three laboratory hours per week. (Spring)


**ETCE 3271. Building Systems.** (3) Prerequisite: ETCE 2410. Basic theory and practical application of heating, ventilation, air conditioning, plumbing and electrical systems in construction. Study of National Fire and Plumbing Codes. (Spring)

**ETCE 3271L. Building Systems Laboratory.** (1) (W) Prerequisite or Corequisite: ETCE 3271. Laboratory exercises demonstrating the basic theory and practical application of heating, ventilation, air conditioning, plumbing and electrical systems in construction. Three laboratory hours per week. (Spring)

**ETCE 4073. Special Topics – Civil Engineering Technology.** (1-4) Prerequisite: senior standing and consent of instructor. A study of new and emerging technical topics pertinent to the field of civil engineering technology. May be repeated for credit. (On demand)

**ETCE 4126. Project Scheduling and Control.** (3) Prerequisite: ETCE 3123. Planning, scheduling, and monitoring construction projects, including development of critical path networks, Gantt bar charts, construction cost control, and reporting practices. (Fall)

**ETCE 4126L. Construction Practices Laboratory.** (1) (W) Prerequisite or Corequisite: ETCE 4126. A synthesis of prior work using fundamental scheduling and cost estimating principles as applied in a directed project. Three laboratory hours per week. (Fall)

**ETCE 4143. Water and Wastewater Systems.** (3) Prerequisite: ETCE 3242. Corequisite: CHEM 1203. Study of water supply, treatment, and distribution and liquid-waste disposal systems. (Fall)

**ETCE 4143L. Environmental Laboratory.** (1) (W) Prerequisite or Corequisite: ETCE 4143. Laboratory on the analysis of water and sewage and problems related to environmental control. Three laboratory hours per week. (On demand)

**ETCE 4165. Structural Steel Design.** (3) Prerequisite: ETCE 3163. Design of beams and columns, floor framing, tensions and compression members, bolted and welded connections according to AISC specifications. (Fall)

**ETCE 4251. Highway Design and Construction.** (3) Prerequisite: ETCE 2112 or AAS degree. Introduction to highway planning, economic considerations, and traffic
engineering. Design and construction of modern highways including grade separations and interchanges. \((Spring)\)

**ETCE 4251L. Asphalt Mixtures Laboratory.** \((1)\) \((W)\) Prerequisite or Corequisite: ETCE 4251. Study of physical properties of asphalt, of aggregates and their combinations, principles and practice in the design, construction and control of asphalt mixtures; laboratory tests for asphalts, aggregates, and mixture design, including specimen preparation and stability evaluation. Three laboratory hours per week. \((On demand)\)

**ETCE 4266. Reinforced Concrete Design.** \((3)\) Prerequisite: ETCE 3163. Design of rectangular beams, T-beams, columns, reinforced concrete floor systems, and reinforced concrete footings according to ACI code. Quality control of concrete and structural inspection. \((Spring)\)

**ETCE 4272. Capstone Project.** \((2)\) \((W,O)\) Prerequisite: Senior standing in Civil Engineering Technology or consent of the Department. Utilization of students’ previous course work to creatively investigate and produce solutions for a comprehensive civil engineering technology project. \((Spring)\)

**ETCE 4344. Applied Hydrology and Storm Water Management.** \((3)\) Prerequisite: ETCE 3242. Treatment of hydrologic principles, prediction of runoff, design of storm water systems and controls, and the application of best management practices. \((On demand)\)

**B. Justification**

1. **Need**

   Of approximately 116 million workers in the U.S., just over 5% or 6 million people are employed in the construction industry. Discounting the U.S. Government, which includes the Armed Forces, the construction industry is the largest employer in the nation. Projections for needed construction and related services is estimated at $3.3 trillion over the next 10 years. Just consider the following examples of work that will be needed over the next ten years:

   - Replace 375,000 bridges as part of $360 billion spent on roadwork.
   - Mass transit will need $72 billion worth of construction.
   - Repair or renovate one out of every three existing schools at a cost of $60 billion.

   UNC Charlotte sits in a unique place from geographic, demographic, and business perspectives for a Construction Management program. The institution provides educational opportunities to residents of the largest metropolitan area in North Carolina. Charlotte is home to one of the most robust construction climates in North America. Furthermore, the Charlotte region is one of the largest metropolitan areas in the United States that does not have a construction science / management program.
In 2000, more than 100 colleges and universities offered 4-year degree programs in construction management or construction science. These programs include courses in project control and development, site planning, design, construction methods, construction materials, value analysis, cost estimating, scheduling, contract administration, accounting, business and financial management, building codes and standards, inspection procedures, engineering and architectural sciences, mathematics, statistics, and information technology. Graduates from 4-year degree programs usually are hired as assistants to project managers, field engineers, schedulers, or cost estimators. According to a salary survey by the National Association of Colleges and Employers, candidates entering the construction industry with a bachelor’s degree in construction management received job offers averaging $40,740 a year. However, the Spring 2000 issue of the Journal of Construction Education projected that the shortage of construction graduates would reach 5,880 by the year 2005.

Information taken from a number of sources, including the Bureau of Labor’s Occupational Outlook Handbook and November 2004 Employment and Wage Estimates, describe projected employment prospects for this profession. Construction managers held about 308,000 jobs in 2000. About 75,000 were self-employed. About 59 percent of construction managers were employed in the construction industry, about 24 percent by specialty trade contractors—for example, plumbing, heating and air-conditioning, and electrical contractors—and about 28 percent by general building contractors. Engineering, architectural, and construction management services firms, as well as local governments, educational institutions, and real estate developers employed others. Data from the National Occupational Employment and Wage Estimates provide estimates of numbers employed as Construction Managers and salary data. Nationally, mean annual wages of $80,070 and median earnings of $70,770 were reported in November 2004. The highest 25 percent earned more than $93,540 while the top 10 percent earned more than $131,260. According to a 2001 salary survey by the National Association of Colleges and Employers, candidates entering the construction industry with a bachelor’s degree in construction management received job offers averaging $40,740 a year. Analogous data from the November 2004 Metropolitan Area Occupational Employment and Wage Estimates for the metropolitan area of Charlotte-Gastonia-Rock Hill, NC-SC provided mean earnings of $79,090 for construction managers.

Excellent employment opportunities for construction managers are expected through 2010 because the number of job openings arising from job growth and replacement needs is expected to exceed the number of qualified managers seeking to enter the occupation over the next several years. Currently, the national economic recovery is based to a large degree on the vast amount of infrastructure development and rehabilitation across the nation. This work will continue as much of our infrastructure has exceeded its design capacity or design life. Even before the devastating 2005 hurricane season, employment of construction managers was expected to grow by 14% nationally (8370 job openings), and North Carolina was expected to see a growth of 21% by 2010 according to state department of labor statistics. As evidence of job opportunities, during the 3 month period immediately following the May 2003 and May 2004 graduation, 100% of the graduating seniors in Civil ET found employment. In fact, most had multiple offers. Since then, the 2005 hurricane season has proven unprecedented, devastating much of the gulf region. Estimates of losses due to 2005 hurricanes reach into the hundreds of billions in the United States. Rebuilding will take years
to complete. Data from the U.S. Census Bureau of the Department of Commerce indicates that construction spending during October 2005 was estimated at a seasonally adjusted annual rate of $1,131.7 billion, which is 7.9 percent above the October 2004 estimate of $1,048.5 billion. The infrastructure and building needs of the Charlotte metropolitan area, coupled with the large construction industry located here, provide unique opportunities for a Construction Management program, including outreach and collaboration with the Charlotte construction community.

In addition to job growth, many openings result annually from the need to replace workers who transfer to other occupations or leave the labor force as a result of retirement. The increasing complexity of construction projects should boost demand for management-level personnel within the construction industry, as sophisticated technology and the proliferation of laws setting standards for buildings and construction materials, worker safety, energy efficiency, and environmental protection have further complicated the construction process. Advances in building materials and construction methods; the need to replace much of the Nation’s infrastructure; and the growing number of multipurpose buildings, electronically operated "smart" buildings, and energy-efficient structures will further add to the demand for more construction managers.

In addition to job growth and replacement needs, the increasing complexity of construction projects is further heightening demand for management-level personnel within the construction industry; increasingly sophisticated technology and the proliferation of laws setting standards for buildings and construction materials, worker safety, energy efficiency, and environmental protection have further complicated the construction industry. Advances in building materials and construction methods; the need to replace much of the Nation’s infrastructure; and the growing number of multipurpose buildings, electronically operated “smart” buildings, and energy-efficient structures will continue to fuel the demand for more and better educated construction managers.

UNC Charlotte’s Department of Engineering Technology has provided quality technical education for over 30 years. Our programs have met rigorous standards for specialized accreditation and we have a long history of working with the Charlotte area construction industry to supply graduates for the greater Charlotte region and throughout North Carolina. This proposed program will only enhance the Department’s outreach and integration with the community, producing much needed construction graduates for the Charlotte construction industry. The proposed program is designed to provide the construction education necessary for entry into the construction industry (residential, commercial, industrial sectors, infrastructure, and heavy horizontal construction) and related careers such as real estate and land development, infrastructure development, code enforcement, and insurance.

2. Prerequisites/co-requisites
Courses proposed herein are freshman, sophomore, junior and senior level. Prerequisites and corequisites have been established, where warranted, to maximize student success and to satisfy applicable accreditation standards.

3. **Course Numbering**

Proposed course numbering is consistent with the University course numbering system for undergraduate courses and the level of academic advancement of students for whom it is intended.

4. **Improvements in Quality of Programs and Instruction**

This program will share a common lower division (freshman and sophomore year) curriculum with the existing Civil Engineering Technology Program, thus maximizing resources and providing students with an opportunity to choose a technical or management orientation in the upper division. In addition, several of the required construction classes in the upper division are already taught with the CIET program. These courses will be shared in the CMET program, thus providing additional synergy.

The CIET program is TAC of ABET accredited, serving a more technical construction industry constituency within the region. The CMET program will seek accreditation from the American Council for Construction Education (ACCE). This will give UNC Charlotte programs options for each of the two agencies which are authorized to accredit construction-oriented programs, ABET and ACCE. Students seeking to pursue the technical path will study the existing TAC of ABET accredited CET program after the sophomore year; students seeking a career in construction management will pursue the ACCE accredited CMET program after the sophomore year. These programs will efficiently serve the spectrum of civil / construction technology through shared faculty and coursework.

C. **Impact**

1. **Students Served**

Undergraduate students majoring in construction management or civil engineering technology will be served by this proposal. In addition, junior level transfer students with related A.A.S. degrees will also be able to matriculate into the four-year programs under the Department’s existing 2+2 transfer arrangement.

2. **Effect on Existing Curricula**

   a. **Added Courses**

      Added courses will be taught on an annual basis commencing in 2006-07. Freshman, Sophomore and Junior courses will be taught beginning 2006-07. Senior courses will be taught in 2007-08.

   b. **Other Courses**

      The content and frequency of offering of existing courses will not be affected.

   c. **Enrollment in Added Courses**
Enrollment projections have been based on a survey of enrollments found at the 56 ACCE accredited CMET programs across the United States. The survey indicated that the average enrollment of all the programs was approximately 250 students when fully mature. In addition, enrollment trends for the CMET programs at Eastern Carolina University (ECU) and Western Carolina University (WCU) were also considered. Currently, ECU’s program’s enrollment exceeds 500 students and WCU’s program is over 225 students after only being in existence for a few years. Based on this data, enrollment of 210 to 240 students by the year 2010 is projected for the proposed program. This results in the following anticipated 2010 course enrollments for major courses:

<table>
<thead>
<tr>
<th>Level</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>55 to 60</td>
<td>55 to 60</td>
</tr>
</tbody>
</table>

d. **Enrollment in Other Courses**

Enrollments in courses outside of the ET Department are anticipated to increase by amounts commensurate with those of the aforementioned added courses. Department chairs from the affected departments have been consulted in development of this proposal.

e. **Special Topic Courses**

None of the courses in this proposal have been offered previously under special topic numbers.

f. **Other Catalog Copy Changes**

Proposed changes and additions to catalog copy to reflect curriculum outlines, degree requirements, etc. are included herein as follows:

**PROPOSED ADDITIONAL CATALOG COPY**

- **On Page 131, right column, modify 3rd paragraph to read as follows:**
  UNC Charlotte offers four curricula leading to a Bachelor of Science in Engineering Technology (BSET) degree: Civil Engineering Technology; Electrical Engineering Technology (with emphases in Electronics Engineering Technology or Computer Engineering Technology); Fire Safety Engineering Technology; and Mechanical Engineering Technology. UNC Charlotte also offers a curriculum leading to a Bachelor of Science in Construction Management (BSCM) degree.

- **On Page 131, right column, modify last sentence of the 4th paragraph, to read as follows:**
  Incoming students with an AAS degree generally receive Junior class standing, with 64 semester credit hours applied toward the BSET or BSCM degree.

- **On Page 134, left column, delete the existing Civil Engineering Technology Program curriculum outlines for both the general and construction emphasizes and replace with the following:**
CIVIL ENGINEERING TECHNOLOGY PROGRAM  
(Effective Fall 2006)

The Civil Engineering Technology program shares a common curriculum with the Construction Management program for the first two years.

Students may move between the common programs until the junior year when the curricula diverge. At the end of the sophomore year, students must select either the analysis and design oriented Civil Engineering Technology BSET degree or the management-oriented BSCM program.

A.A.S. transfer students from approved programs will receive 64 credit hours for the A.A.S. degree; thus, A.A.S. students need only to complete the upper-division portion of the curriculum listed below and remediate any entrance deficiencies noted upon matriculation. The curriculum is outlined below for both entering Freshmen and A.A.S. transfer students.

### Freshmen Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETCE 1121</td>
<td>Construction Methods</td>
<td></td>
</tr>
<tr>
<td>ENGL 1101</td>
<td>English Composition or ENGL 1103</td>
<td></td>
</tr>
<tr>
<td>ETGR 1100</td>
<td>Engineering Computer Applications</td>
<td></td>
</tr>
<tr>
<td>ETGR 1201</td>
<td>Intro. to Engineering Technology</td>
<td></td>
</tr>
<tr>
<td>ETGR 1103</td>
<td>Technical Drawing I</td>
<td></td>
</tr>
<tr>
<td>MATH 1100</td>
<td>College Algebra and Probability</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>ETCE 1211</td>
<td>Surveying I</td>
<td></td>
</tr>
<tr>
<td>ETCE 1222</td>
<td>Construction Materials</td>
<td></td>
</tr>
<tr>
<td>CMET 1680</td>
<td>Professional Development I</td>
<td></td>
</tr>
<tr>
<td>ENGL 1102</td>
<td>Writing in the Academic Community or Writing Elective</td>
<td></td>
</tr>
<tr>
<td>ETGR 1104</td>
<td>Technical Drawing II</td>
<td></td>
</tr>
<tr>
<td>MATH 1103</td>
<td>Precalculus Math for Science &amp; Eng.</td>
<td></td>
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<tr>
<td></td>
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<td>15</td>
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</tbody>
</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETCE 2112</td>
<td>Construction Surveying &amp; Layout</td>
<td></td>
</tr>
<tr>
<td>ETGR 2101</td>
<td>Applied Mechanics I</td>
<td></td>
</tr>
<tr>
<td>GEOL 1200</td>
<td>Physical Geology or CHEM 1111 or 1251</td>
<td></td>
</tr>
<tr>
<td>MATH 1121</td>
<td>ET Calculus</td>
<td></td>
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<tr>
<td>PHYS 1101</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1101L</td>
<td>Introductory Physics I Laboratory</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>ETCE 2410</td>
<td>Intro. Environmental Eng. Technology</td>
<td></td>
</tr>
<tr>
<td>CMET 2680</td>
<td>Professional Development II</td>
<td></td>
</tr>
<tr>
<td>ETGR 2102</td>
<td>Applied Mechanics II</td>
<td></td>
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<tr>
<td>PHYS 1102</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 1102L</td>
<td>Introductory Physics II Laboratory</td>
<td></td>
</tr>
<tr>
<td>STAT 1220</td>
<td>Elements of Statistics I</td>
<td></td>
</tr>
<tr>
<td>Directed Elective (3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TOTAL CREDIT HOURS = 128

**CIET Curriculum Outline Footnotes:**

1. Course selected based on Math Placement Test.
2. Writing elective available upon successful completion of ENGL 1103.
3. Directed electives may be major field courses or general education courses. They are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non AAS degree students must satisfy University and CIET general education requirements. AAS degree students must satisfy CIET general education requirements.
4. Major elective courses must be courses within the Department of Engineering Technology and approved by the faculty.

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On Page 137, append the following text to the end of the existing catalog copy:

**BACHELOR OF SCIENCE IN CONSTRUCTION MANAGEMENT (BSCM)**
Starting in the 2006-07 academic year the Department of Engineering Technology will be offering a new degree program leading to the Bachelor of Science in Construction Management (BSCM).

Students for this degree may enter as freshmen commencing the 2006-07 academic year. Transfer students from technical or community college with appropriate AAS degrees will also be admitted.

Requirements for Admission. Applicants for this program may enter directly after completing high school or may enter with 64 credit hours for an Associate in Applied Science degree in Architectural, Civil, Construction or other similarly named Engineering Technology degree earned at a technical or community college and approved by the Department.

Freshman Admission: Applicants entering as freshmen must meet the University admission requirements.

Transfer Admission: Transfer applicants not having the Associate in Applied Science (AAS) degree or its equivalent must meet University admission requirements.

Transfer applicants with AAS degrees must:

1. Hold an Associate of Applied Science degree in a field from among Architectural, Building Construction, Civil, Construction, Design and Drafting, or Surveying Technology or similar title with curriculum acceptable to the Department;

2. An overall grade point average of at least 2.2 (based on the 4.0 system) on all courses taken at the technical institute or community college; and

3. Have completed satisfactorily the prerequisite background courses for the program (a limited number of such background courses may be made up by taking them at UNC Charlotte).

Acceptance of the AAS degree indicates the acceptance of up to 64 hours toward the Bachelor of Science in Construction Management degree program only. These hours are not valid toward any other degree program in the University.

There is considerable variance in the contents of technical programs throughout the United States. Should this result in entrance deficiencies, the student can usually remove these deficiencies at a community or technical college prior to admission to UNC Charlotte, or during the first year at UNC Charlotte.

Residence Requirements. A student must earn the last 30 semester hours of credit toward the degree and the last 12 semester hours of work in the major at this University to satisfy residence requirements.

Academic Requirements and Discontinuance Conditions in Construction Management. In addition to University and College of Engineering conditions, a student who is admitted to the CM program without meeting ALL published admission requirements is expected to remove all admission deficiencies within one year. Violators are subject to discontinuance.

Course Requirements. Course requirements correspond to the mode of admission for each student as outlined hereafter.

1. Entering Freshmen: Students admitted as entering freshmen will complete the respective four year curriculum as described below.

2. Transfer students holding an AAS degree: Transfer students with an acceptable associate degree as defined previously under admission requirements begin the program at the junior year with up to 64 credit hours awarded. Prerequisites for students holding an acceptable associate degree from a community or technical college are listed below.

3. Transfer students not holding an associate degree: Transfer students not holding an AAS degree must complete the remaining coursework for the four year curriculum after transfer credit application.

Prerequisites for admission: Students must have satisfactorily completed the following subjects in their two-year associate degree program:

- English Composition and/or Technical Writing (6 semester hours)
- Algebra and Trigonometry (6 semester hours)
- Calculus and Statistics (6 semester hours)
- Analytical Physical or Environment Science with laboratory (8 semester hours)
- Macro Economics (3 semester hours)
- Construction Methods (3 semester hours)
- Construction Materials (3 semester hours)
- Statics (3 semester hours)
- Strength of Materials (3 semester hours)
- Construction Surveying (3 semester hours)
- Computer Aided Drafting (3 semester hours)
- Environmental Technology or Hydraulics or Hydorlogy (3 semester hours)
- Engineering Technology Computing Applications (3 semester hours)

CURRICULUM OUTLINE

Construction Management Program

Freshman Year

ETCE 1121 Construction Methods ..........................3
ENGL 1101 English Composition or ENGL 1103 Accelerated College Writing & Rhetoric ......3
Construction B&M Core - ETGR 1100 67 - Engineering
Technology Computer Applications ....................................... 3
ETGR 1201 Intro to Engineering Technology .......................... 2
ETGR 1103 Technical Drawing I ......................................... 2
MATH 1100 College Algebra and Probability or
MATH 1103 or MATH 1121 ............................................. 3

ETCE 1211 Surveying I .................................................... 3
ETCE 1222 Construction Materials ...................................... 3
CMET 1680 Professional Development I .............................. 1
ENGL 1102 Writing in the Academic Community or
Writing Elective .......................................................... 3
ETGR 1104 Technical Drawing II ....................................... 2
MATH 1103 Precalculus Math for Science & Eng. or
MATH 1121 or Free Elective(3) ...................................... 3

Sophomore Year
ETCE 2112 Construction Surveying & Layout ....................... 3
ETGR 2101 Applied Mechanics I ....................................... 3
GEOL 1200 Physical Geology or CHEM 1111 or 1251 .......... 3
MATH 1121 Calculus (ET) or Free Elective(3) ....................... 3
PHYS 1101 Introductory Physics I ..................................... 3
PHYS 1101L Introductory Physics I Laboratory ..................... 1

ETCE 2410 Intro. Environmental Eng. Technology ............... 3
CMET 2680 Professional Development II ............................ 1
ETGR 2102 Applied Mechanics II .................................... 3
PHYS 1102 Introductory Physics II .................................. 3
PHYS 1102L Introductory Physics II Laboratory .................. 1
STAT 1220 Elements of Statistics I .................................. 3
Directed Elect./Construction B&M Core(4,5) – ECON 2101 .. 3

Junior Year
ETCE 3123 Cost Estimating ............................................. 3
ETCE 3131 Foundations & Earthwork ................................. 3
ETCE 3131L Soil Testing Laboratory (W) ........................... 1
ETCE 3163 Structural Analysis & Design I ......................... 3
ETCE 3163L Structures & Materials Laboratory (W)............ 1
Construction B&M Core(4) /Accounting 2121 ................. 3
ETGR 3071 ET Professional Seminar .................................. 1

CMET 3224 Construction Project Administration .................. 3
ETCE 3271 Building Systems ......................................... 3
ETCE 3271L Building Systems Laboratory (W) ................... 1
CMET 3680 Professional Development III ......................... 1
Construction B&M Core - ETGR 3222(4) – Engineering
Economics ............................................................... 3
Construction B&M Core(4) /Accounting 2122 ................. 3
Directed Elective ........................................................ 3

Senior Year

CMET 4125 Construction Codes and Documents .................. 2
ETCE 4126 Project Scheduling and Control ....................... 3
ETCE 4126L Construction Practices Laboratory (W) ....... 1
Construction B&M Core(6) – BLAW 3150 ....................... 3
Directed Elective ........................................................ 3
Directed Elective ........................................................ 3

TOTAL CREDIT HOURS = 128

Curriculum Outline Footnotes:
(1) Course selected based on Math Placement Test.
(2) Writing elective available upon successful completion of ENGL 1103.
(3) Free elective available upon successful completion of MATH 1121.
(4) Completion of the Construction B&M (business /management) Core is required: ETGR 1100; ECON 2101; ETGR 3222; ACCT 2121; ACCT 2122; BLAW 3150; and MGMT 3140. ECON 2101 doubles as Construction B&M Core and Social Science Elective in sophomore year. ETGR 1100 and ETGR 3222 serve as replacement prerequisites to INFO 2130 and ECON 2102 for Construction students taking MGMT 3140 and FINN 3120 (core elective). Construction B&M Core courses must be completed with a grade of C or better.
(5) Directed electives may be major field courses or general education courses. They are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non AAS degreed students must satisfy University and CMET general education requirements. AAS degreed students must satisfy CMET general education requirements.
(6) Core Elective may be Technical or Construction B&M. Technical Core Electives must be courses within the Department of Engineering Technology and approved by advisor (ETGR, ETCE, CMET, ETFS, ETEE, or ETME). Construction B&M Elective must be from following list: MKTG 3110, FINN 3120, or CMET 4127 or approved by the construction faculty advisor.
D. Resources Required to Support Proposal

1. Personnel
The construction management program will share faculty resources with the existing CIET program. Currently, five full-time and three part-time faculty members deliver the CIET program. Addition of the CMET program will require four additional faculty members at the onset to support an anticipated enrollment increases and new course offerings. Three faculty members and a faculty associate should be added to support the program in the first two years of program delivery.

2. Physical Facility
With the move by the ECE, ME and CE departments to new facilities on campus, ample space will be available in the Smith Building to house the CMET program. Office space for new faculty members will be required as well as construction project space for student projects. However, sufficient office and laboratory space will be made available in the Smith Building upon the relocation of the other departments to meet the requirements of the CMET program. Some renovations to Smith Building will be necessary.

3. Equipment and Supplies
Most of the equipment required to operate the program is available within the existing CET program. Approximately $65,000 in additional equipment will be needed to support coursework in construction materials, construction methods, estimating, planning and surveying.

4. Computer
The computer labs and facilities currently supported by the College of Engineering are considered adequate to satisfy the needs of the CMET program. Software requirements include Microsoft Office, Matlab, AutoCAD, Timberline Estimating, Primavera SureTrak, and AutoDesk Land Development, all of which are currently available on the computer network system.

5. Audio-Visual
No additional audio and/or visual equipment or media production services from Media Services are required. Existing facilities are adequate.

6. Other Resources
The preparation, printing, and mailing of marketing materials such as pamphlets, brochures, posters, etc. will be required to promote the new CMET program and to recruit new students. Approximately $3,500 will be required to support the initial recruitment activities.

7. Funding
Funding for the new and/or additional resources will be provided by state-appropriated and enrollment increase funds.
E. Consultation With The Library and Other Departments or Units

1. Library Consultation
   The Library Reference Staff was contacted relative to this proposal. They have indicated that existing library holdings are adequate to support the proposal (consultation on library holdings form attached).

2. Consultation with Other Units
   The following departments/units which are involved in the delivery of courses required in this proposal and were notified and/or consulted:

   § Associate Dean for General Education
   § Department of Accounting
   § Department of Chemistry
   § Department of Economics
   § Department of Finance and Business Law
   § Department of Geography and Earth Sciences
   § Department of Management
   § Department of Mathematics and Statistics
   § Department of Physics & Optical Science

   Support was received from all departments. The Construction Business/Management Core was developed with significant input from the Belk College of Business (Accounting, Economics, Finance & Business Law, and Management). The Department of Physics and Optical Sciences and Department of Mathematics and Statistics gave support for the required physics and mathematics courses, respectively. The Department of Chemistry and Department of Geography & Earth Sciences supports the chemistry and geology options in the proposal.

   The following departments within the College of Engineering have been consulted through presentations at COEN faculty and CAC meetings:

   § Department of Civil Engineering
   § Department of Electrical and Computer Engineering
   § Department of Mechanical Engineering and Engineering Science
   § College of Engineering Office of Student Development & Success (Freshman Engineering)

   Formal letters, memoranda or email correspondence of endorsement/support from various units have been received and copies are included in the Appendix.

F. Initiation And Consideration of The Proposal

1. Originating Unit
   The Department of Engineering Technology faculty unanimously approved this curriculum proposal on December 8, 2005.
2. Other Considering Units

The Intent to Plan for a Baccalaureate of Science in Construction Management was submitted by the University on April 18, 2005.

The Civil and Construction Industry Advisory Board has encouraged and endorsed this proposal. A letter from the Chairman of the Board is attached.

This proposal is supported by the American Council of Construction Education (ACCE), the Charlotte Chapter of the Professional Construction Estimators Association (PCEA), the Association of General Contractors (AGC), and the Associated Schools of Construction (ASC). Letters from each is attached to this proposal.

G. Attachments
1. Documentation of Consultations (Appendix G1)
2. Undergraduate Course Outlines (Appendix G2)
Appendix G1:
DOCUMENTATION OF CONSULTATIONS
Appendix G1: Documentation of Consultations

UNCCCHARLOTTE

Consultation on Library Holdings
J. Murrey Atkins Library

To: Dr. Tony Brizendine
From: Joanne S. Klein
Date: December 2, 2005

Course/Program: New Degree Program: Bachelor of Science in Construction Management

Summary of Librarian’s Evaluation of Holdings:

Evaluator: Joanne S. Klein Date: December 2, 2005

Please Check One:
- Holdings are superior
- Holdings are adequate [X]
- Holdings are adequate only if Dept. purchases additional items.
- Holdings are inadequate

Comments:

A search of the online catalog in the area of construction management retrieved 3312 pertinent items. Please see the following table. Of this total, 751 have been acquired since 1999. Because there is some overlap of subject headings, the actual total number of titles may be less than this, but the collection, especially if bolstered by ongoing purchases for this and the interrelated Engineering Technology, Civil Engineering, Engineering Management and Architecture programs, is current and quite adequate to support this new degree program. The Library owns or has electronic access to 42 journals and 248 electronic resources specific to this area. In addition, the library has approximately 40 electronic databases, many
Appendix G1:
Documentation of Consultations

with links to full text articles. Also, the library’s participation in an interlibrary loan consortium provides another means of effectively supporting research needs.

Atkins Library Holdings in Areas Related to Construction Management
December, 2005

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<tr>
<th>Keyword/Subject Heading</th>
<th>All Holdings</th>
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<th>Journals</th>
<th>Electronic Resources</th>
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<td>32</td>
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</table>

Joanne S. Klein
Reference Librarian
Engineering and Information Technology
J. Murrey Atkins Library
University of North Carolina at Charlotte
9201 University City Boulevard
Charlotte, NC  28223
(704) 687-3232
December 6, 2005

Anthony L. Brizendine, Ph.D., PE
Chair & Professor, Department of Engineering Technology
University of North Carolina at Charlotte
9201 University City Blvd
Charlottesville, NC 28223-0001

Re: Construction Management Program

Dear Dr. Brizendine,

You have inquired about the potential of developing a program in Construction Management for your Department in the University of North Carolina at Charlotte. In working with the American Council for Construction Education, we have a keen insight into the demand for Construction Management graduates in our country, and can say without any reservation, there is a severe need for additional graduates out of a program like yours (and others!).

As you know, the construction industry represents approximately 8% of our Gross Domestic Product. Employing over 7 million people daily in our country, the construction industry continues to evolve, implementing an increasing amount of state-of-the-art technology. Construction companies: general contractors, specialty subcontractors, consultants, owners, including governmental agencies all are demanding Construction Managers to be the leaders in this technology revolution, from within.

The management of these companies and their various elements is the key to their success, not only success in delivering their services, but also success in managing the risk of the company, the project and needs of their clients. Construction Management Programs are the best in preparing the future owners of construction companies – this was the initial impetus in establishing the American Council for Construction Education. The development of standards for Construction Management was and continues to be a collaboration of educators and practitioners to find the balance for these graduates.

A study completed by Dr. David Bilbo of Texas A & M projected that in 2003, the number of Construction Management graduates was going to meet only 50% of the needs of the industry. Anecdotally, that number (50%) was high – the demand was much greater than the graduates available. The BLS says in 2003 the national average of starting salaries in 2003 for Construction Management graduates with a 4-year degree was $42,300; today it is over $46,000, with 100% of the graduates having a job before graduation. Certainly, this is an indication of how these programs and graduates from them are needed in our industry.
December 6, 2005
Dr. Anthony L. Brizendine
Page 2 of 2

We are excited about your moving forward in developing a degree program in Construction Management. As the accrediting body for Construction Science and Management programs in the US, we look forward to working with your Department on this project. Please call us if there is more we can do to support your efforts.

Best regards,
American Council for Construction Education

Michael M. Holland
Executive Vice President
December 13, 2005

Anthony L. Brizendine, PhD, PE
Chair & Professor, Department of Engineering Technology
University of North Carolina at Charlotte
9201 University City Blvd
Charlotte, NC 28223-0001

SUBJECT: CONSTRUCTION MANAGEMENT PROGRAM

Dear Dr. Brizendine:

As Chairman of the Civil & Construction Board of Industry Advisors for the Department of Engineering Technology, I am writing this letter of support for the proposed Bachelor of Science in Construction Management program at UNC Charlotte. The Engineering Technology Department has taken our input seriously and has addressed the needs of the construction industry in and around Charlotte in developing this proposed program. The Board is pleased that this initiative is finally moving forward.

The proposed program will benefit greatly from the existing BSET program in Civil Engineering Technology. Courses, laboratories and facilities currently utilized in the Civil ET program can be shared and provide an excellent base for the proposed Bachelor of Science in Construction Management program. Additionally, the existing Civil ET faculty provides a strong core from which to build the program; they are an outstanding group with excellent credentials and significant construction and project management experience. The practical experience of the existing faculty, overall strength of the engineering technology programs, and philosophy of applied engineering in the Department provides the ideal formula for success of the proposed construction management program.

The construction industries of Charlotte and the surrounding areas have needed this program for some time, and we look forward with anticipation to the initiation of the program.

Sincerely yours,

Jeffrey L. Gagné, PE
Chairman, UNC Charlotte Civil & Construction Technology Advisory Board
Vice President, Construction Services, Ralph Whitehead Associates, Inc.
December 19, 2005

Anthony L. Brizendine, PhD, PE
Chair & Professor, Department of Engineering Technology
University of North Carolina at Charlotte
9201 University City Blvd
Charlotte, NC 28223-0001

Dear Anthony,

Carolinas AGC, Inc. is pleased to support your plans to offer a bachelor of science in construction management.

As your executive summary for this proposal describes, the Charlotte Metrolina region is expected to continue its growth and demand for construction services in all sectors. This growth will continue to place demands on our industry to provide qualified professionals to meet the needs of a changing industry.

We believe that forging partnerships between the public, private, educational and association sectors are needed to meet the challenge of recruitment, training, placement and professional development of our workforce.

Our relationship previously has been positive and productive. Examples include our partnership and support in such programs as the UNCC/AGC Student Chapter and the CAGC HUB Academies offered on the Charlotte campus.

Development of this Bachelor of Science program will be an additional positive step in dealing with this demand.

Carolinas AGC, Inc. salutes your department for this proposal and offers our support in making this plan a reality.

Sincerely,

Stephen P. Gennett, President & CEO
Carolinas AGC, Inc.
December 5, 2005

Anthony L. Brizendine, PhD, PE  
Chair & Professor, Department of Engineering Technology  
University of North Carolina at Charlotte  
9201 University City Blvd  
Charlotte, NC 28223-0001

Dear Dr. Brizendine:

On behalf of the Charlotte Chapter of the Professional Construction Estimators Association (PCEA), it is my pleasure to express our support for your proposal to establish a BS in Construction Management (BSCM) at UNC Charlotte. As you are aware, our organization has supported your existing BSET program in Civil Engineering Technology for many years. The existing Civil Engineering Technology program provides a strong foundation for the proposed Construction Management program.

The Charlotte construction industry is robust; in fact, the region has an insatiable appetite for construction professionals. We are continuously seeking new sources of construction talent. Without doubt, the proposed program will provide the educational access necessary for many citizens of the region to enter our profession. Therefore, we look forward with eagerness to the initiation of this new program option in your Department beginning next year.

Please let us know at PCEA if we can be of assistance in the establishment of this program.

Sincerely yours,

Bobby Phillips  
Vice President, Wayne Brothers, Inc.
Brizendine, Anthony L

From: Gandar, John
Sent: Thursday, January 20, 2005 2:21 PM
To: BRIZENDINE, ANTHONY L
Subject: RE: Construction Management Program

Tony

Apologies that this reply took so long.

I have checked with all six chairs of Belk College departments (since all are impacted in varying degrees) about their support for the new Construction management program. While all have expressed some concerns about the impact the program may have on enrollment in their courses in a period which the College seeks to substantially cut its undergraduate enrollment, all also support the guiding principles behind your program, wish to encourage truly interdisciplinary programs, and want to further the cooperation between our Colleges. For this reason, as the representative of the Belk College, I endorse you program and promise to provide all reasonable support for it in the future.

Sincerely, John

John M. Gandar
Interim Associate Dean
The Belk College of Business Administration
University of North Carolina at Charlotte
Charlotte, NC 28223
jmangandar@email.uncc.edu
(704) 687-4133 (office phone)

P.S. Let me know if you need more than this - like individual chair endorsements

From: BRIZENDINE, ANTHONY L
Sent: Tuesday, December 21, 2004 12:24 PM
To: Gandar, John
Subject: RE: Construction Management Program

Hi John,

As a quick reminder, I made the changes you and your colleagues requested to the business/management piece of our proposed curriculum and sent you the updated information. I've attached again for your convenience.

At this point, I am hoping to receive a letter or email from you indicating that the College of Business Administration supports our plans for the Construction Management program so that I can include with our intent to plan, which will be moving forward to AA in early January.

thanks,
Tony

From: Gandar, John
Sent: Tuesday, December 21, 2004 10:39 AM
To: BRIZENDINE, ANTHONY L
Subject: FW: Construction Management Program

1/20/2006
Hello All,

I hope your spring semester is off to a good start.

The Engineering Technology Department is in process to submit request to establish and curriculum for the BS in Construction Management. I believe I have discussed this initiative with most, if not all of you previously. The intent to plan was submitted April 2005. I wanted to make sure that you support the proposed mathematics, statistics, chemistry, geology, and physics requirements, respectively.

This CM curriculum has the same math/science requirements as our existing Civil ET program, namely; Math 1100, 1103, 1121; Stat 1220; Physics 1001/1002 with labs; one of either Chem 1111, 1251 or Geol 1200. The model curriculum is attached as a pdf file.

I would certainly appreciate an email response indicating your support. Otherwise, if you have questions or concerns, please let me know.

best regards,
Tony

Anthony L. Brizendine, PhD, PE
Chair & Professor, Department of Engineering Technology
University of North Carolina at Charlotte
9201 University City Blvd
Charlotte, NC 28223-0001
tele: 704-687-2305
fax: 704-687-6653
e-mail: albrizen@uncc.edu
web: www.et.uncc.edu
Alan,

First, thank you for your support. Secondly, we would certainly consider our requirements of Math 1100/1103/1121 met for a student who has completed the 1241/1242 sequence. We would still want these students to complete STAT 1220 or some equivalent.

thanks,
Tony

-----Original Message-----
From: Dow, Alan
Sent: Monday, January 23, 2006 6:20 AM
To: Brizendine, Anthony L
Subject: Re: New Construction Management Program

Dear Tony

I have read over the Construction Management Program and I can report that it has the full support of the Department of Mathematics and Statistics. The sequence of Math and Stat courses chosen for this program are quite appropriate. Do you consider a student who completes the sequence Math 1241-1242 as having complete the sequence up through Math 1121?

Alan
Hello Faramarz,

We appreciate your support.

best regards,
Tony

Hi Tony,

The Department of Physics and Optical Science fully supports your proposal to establish a BS program in Construction Management.

Good luck,

Faramarz Farahi

Faramarz Farahi
Professor and Chair
Department of Physics and Optical Science
University of North Carolina at Charlotte
Charlotte, NC 28223
Tel: (704) 687-3440
Fax: (704) 687-3160
mailto:ffarahi@uncc.edu
Hi Jerry,

We appreciate your support. Will do on the Geology lab....

thanks,
Tony

From: Brizendine, Anthony L  
Sent: Tuesday, January 24, 2006 12:16 PM  
To: Ingalls, Gerald  
Subject: RE: New Construction Management Program

Hi Jerry,

We appreciate your support. Will do on the Geology lab....

thanks,
Tony

From: Ingalls, Gerald  
Sent: Monday, January 23, 2006 12:50 PM  
To: Brizendine, Anthony L  
Subject: FW: New Construction Management Program

Tony,

Please see the comments from John Bender below. We have no difficulty with your proposal and endorse your efforts. Please recommend that your students take the lecture and the lab if they opt to take the Geology coursework.

Jerry

------ Forwarded Message
From: jfbender@jfbender@gmail.com  
Date: Mon, 23 Jan 2006 11:04:17 -0500  
To: jfbender@jfbender@gmail.com  
Subject: New Construction Management Program

No problems except that they should probably take the lab in addition to the lecture for GEOL 1200!

J

On 1/21/06 11:27 AM, "gingalls" <gingalls@email.uncc.edu> wrote:

John,

I assume we are going to be OK with this?

Jerry
Appendix G2:
Undergraduate Course Outlines

Appendix G2:
Undergraduate Course Outlines
PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 1680 – PROFESSIONAL DEVELOPMENT I

Proposed Catalog Description:

CMET 1680. Professional Development I. (1) Prerequisite: Open to freshman level Civil Engineering Technology and Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (*Pass/No Credit grading*) (*Spring*)

Proposed Text:

None

Proposed Course Outline:

This course is held in common with CMET 2680, CMET 3680, CMET 4680, ETCE 3680, and ETCE 4680. Actual topical areas and sequences are subject to the selection of invited lecturers from both academia and industry. Typical topics would include the following:

- Promotion of Professional Organizations and Student Chapter Activities
- Office of Student Development and Success (OSDS) Resources
- University Career Center Job Placement Resources
- Industry Presentations of Local Civil Engineering/Construction Projects
- Professional Ethical Issues
- Workplace Diversity and Sexual Harassment Issues
- Professional Certification and Exams
- On-going Faculty Research Presentations
- Office of International Programs / Promotion of Exchange Programs
- Co-op and Internship Opportunities
- Recognition of Student Achievement and Graduating Seniors
PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 2680 – PROFESSIONAL DEVELOPMENT II

Proposed Catalog Description:

CMET 2680. Professional Development II. (1) Prerequisite: Open to sophomore level Civil Engineering Technology and Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

Proposed Text:

None

Proposed Course Outline:

This course is held in common with CMET 1680, CMET 3680, CMET 4680, ETCE 3680, and ETCE 4680. Actual topical areas and sequences are subject to the selection of invited lecturers from both academia and industry. Typical topics would include the following:

- Promotion of Professional Organizations and Student Chapter Activities
- Office of Student Development and Success (OSDS) Resources
- University Career Center Job Placement Resources
- Industry Presentations of Local Civil Engineering/Construction Projects
- Professional Ethical Issues
- Workplace Diversity and Sexual Harassment Issues
- Professional Certification and Exams
- On-going Faculty Research Presentations
- Office of International Programs / Promotion of Exchange Programs
- Co-op and Internship Opportunities
- Recognition of Student Achievement and Graduating Seniors
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 3224 – CONSTRUCTION PROJECT ADMINISTRATION

Proposed Catalog Description:

CMET 3224. Construction Project Administration. (3) Prerequisite: Junior Standing or AAS degree. A study of the project management processes used in the design and construction of civil engineering projects. Topics include the roles and responsibilities of project participants, project delivery methods, engineering and construction contracts, project control and documentation, and dispute resolution mechanisms. (Spring)

Proposed Text:

Or

Proposed Course Outline:

Week 1: Overview of the Construction Industry
Week 2: Project Delivery Systems
Week 3: Procurement of Engineering Services
Week 4: Procurement of Construction Services
Week 5: Contract Documents and Law
Week 6: Project Controls and Risk Management
Week 7: Project Work Breakdown Structure
Week 8: Cost Estimating Fundamentals
Week 9: Project Scheduling Fundamentals
Week 10: Cost Accounting Fundamentals
Week 11: Project Management Computer Applications
Week 12: Project Management Computer Applications
Week 13: Change Orders and Dispute Resolution
Week 14: Quality Control Practices
Week 15: Construction Safety
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 3680 – PROFESSIONAL DEVELOPMENT III

Proposed Catalog Description:

CMET 3680. Professional Development III. (1) Prerequisite: Open to junior level Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

Proposed Text:
None

Proposed Course Outline:

This course is held in common with CMET 1680, CMET 2680, CMET 4680, ETCE 3680, and ETCE 4680. Actual topical areas and sequences are subject to the selection of invited lecturers from both academia and industry. Typical topics would include the following:

- Promotion of Professional Organizations and Student Chapter Activities
- Office of Student Development and Success (OSDS) Resources
- University Career Center Job Placement Resources
- Industry Presentations of Local Civil Engineering/Construction Projects
- Professional Ethical Issues
- Workplace Diversity and Sexual Harassment Issues
- Professional Certification and Exams
- On-going Faculty Research Presentations
- Office of International Programs / Promotion of Exchange Programs
- Co-op and Internship Opportunities
- Recognition of Student Achievement and Graduating Seniors
Appendix G2:  
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE  
CMET 4073 – SPECIAL TOPICS CONSTRUCTION MANAGEMENT

Proposed Catalog Description:

**CMET 4073. Special Topics – Construction Management.** (1-4) Prerequisite: senior standing and consent of instructor. A study of new and emerging technical topics pertinent to the field of construction management. May be repeated for credit. *(On demand)*

Proposed Text:

Text to be selected by instructor based on course topic.

Proposed Course Outline:

Course outline to be established by instructor based on course topic.
Proposed Catalog Description:

CMET 4125. Construction Codes and Documents. (2) Prerequisites: Junior Standing or AAS degree. An analysis of construction contract documents, building codes, permits, and specifications. (Fall)

Proposed Text:

Or 

Proposed Course Outline:

Week 1: The Nature of Construction Contracts
Week 2: Stipulated-Sum and Cost-Plus-Fee Contracts
Week 3: Unit Price and Material Quantity Contracts
Week 4: Design-Build and Alternative Delivery Contracts
Week 5: Subcontracts and Supply Contracts
Week 6: International Construction Contracts
Week 7: Industry Standard Contracts & Documents
Week 8: Bid Preparation and Procedures
Week 9: Negotiated Contracts
Week 10: Administration of Contracts
Week 11: Standard Specifications
Week 12: Uniform Building Code
Week 13: Other Specialty Codes & Regulations
Week 14: Construction Permits and Inspections
Week 15: Contractor Licensing
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 4127 – CONSTRUCTION LAW AND REGULATORY ISSUES

Proposed Catalog Description:

CMET 4127. Construction Law and Regulatory Issues. (3) Examination of the legal problems encountered by architects, engineers, contractors, owners, sureties, and lenders involved in the construction process. Special emphasis on the legal rights and liabilities of the various participants in construction projects. Claims preparation, negotiation, arbitration, and litigation methods of dispute resolution. (On demand)

Proposed Text:

Or
Or

Proposed Course Outline:

Week 1: Introduction to the Legal System and the Maxims of Law
Week 2: Laws, Ethics, and Morality
Week 3: Relationships among the Parties on the Project
Week 4: Risk, Responsibility and Dispute Avoidance
Week 5: Bidding Procedures and Errors
Week 6: Insurance and Bonds
Week 7: Mechanics’ Liens and Warranties
Week 8: Differing and Unforeseen Site Conditions
Week 9: Delays, Suspensions, and Terminations
Week 10: Constructive Acceleration
Week 11: Liquidated Damages and Time Extensions
Week 12: Joint Liability and Indemnity
Week 13: Contract Interpretation, Documentation, and Records
Week 14: Construction Contract Claims
Week 15: Dispute Resolution
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 4228 – CONSTRUCTION OFFICE OPERATIONS

Proposed Catalog Description:

CMET 4228, Construction Office Operations. (2) Prerequisite: CMET 3224. A study of management issues encountered in home and job-site office operations. Topics include construction safety, insurance and risk management, labor relations, procurement, cost accounting, subcontracting, and labor and equipment resource allocation and management. (Spring)

Proposed Text:


Supplementary Texts:

And
And

Proposed Course Outline:

Week 1: Occupational Safety and Health Administration (OSHA) Standards
Week 2: The Impact of Poor Site Safety
Week 3: Safety Incentives to Reduce Injuries
Week 4: Development of Site-Specific Safety Plan
Week 5: The Surety Relationship
Week 6: Types of Surety Bonds
Week 7: The Underwriting Process
Week 8: Surety Bond Claims
Week 9: Accounting for Financial Resources
Week 10: Managing Costs and Profits
Week 11: Managing Cash Flows
Week 12: Making Financial Decisions
Week 13: Labor Workforce and Trade Unions
Week 14: Equipment Selection and Management
Week 15: Subcontractors and Suppliers
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 4272 – CAPSTONE PROJECT

Proposed Catalog Description:

CMET 4272. Capstone Project. (2) (W,O) Prerequisite: Senior standing in Construction Management and consent of the Department. Utilization of students’ previous course work to creatively investigate and produce solutions for a comprehensive construction management project. (Spring)

Proposed Text:

None

Proposed Course Outline:

Week 1: Class Procedures and Objectives
Week 2: Project Scope and Definition
Week 3: Submittal of Formal Written Project Proposal and Schedule
Week 4: Weekly Consultation with Faculty Project Advisor
Week 5: Weekly Consultation with Faculty Project Advisor
Week 6: Weekly Consultation with Faculty Project Advisor
Week 7: Weekly Consultation with Faculty Project Advisor
Week 8: Submittal of Mid-Semester Project Status Report
Week 9: Weekly Consultation with Faculty Project Advisor
Week 10: Weekly Consultation with Faculty Project Advisor
Week 11: Weekly Consultation with Faculty Project Advisor
Week 12: Weekly Consultation with Faculty Project Advisor
Week 13: Weekly Consultation with Faculty Project Advisor
Week 14: Project Oral Presentations
Week 15: Project Oral Presentations & Written Reports Due
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
CMET 4680 – PROFESSIONAL DEVELOPMENT IV

Proposed Catalog Description:

CMET 4680. Professional Development IV. (1) Prerequisite: Open to senior level Construction Management majors. Seminar discussing professional development issues relating to the civil engineering technology and construction management professions. One hour per week. (Pass/No Credit grading) (Spring)

Proposed Text:

None

Proposed Course Outline:

This course is held in common with CMET 1680, CMET 2680, CMET 3680, ETCE 3680, and ETCE 4680. Actual topical areas and sequences are subject to the selection of invited lecturers from both academia and industry. Typical topics would include the following:

- Promotion of Professional Organizations and Student Chapter Activities
- Office of Student Development and Success (OSDS) Resources
- University Career Center Job Placement Resources
- Industry Presentations of Local Civil Engineering/Construction Projects
- Professional Ethical Issues
- Workplace Diversity and Sexual Harassment Issues
- Professional Certification and Exams
- On-going Faculty Research Presentations
- Office of International Programs / Promotion of Exchange Programs
- Co-op and Internship Opportunities
- Recognition of Student Achievement and Graduating Seniors
Appendix G2:
Undergraduate Course Outlines

PROPOSED CLASS DESCRIPTION AND OUTLINE
ETCE 3163L – STRUCTURES AND MATERIALS LABORATORY

Proposed Catalog Description:

ETCE 3163L. Structures and Materials Laboratory. (1) (W) Prerequisite or Corequisite: ETCE 3163. Laboratory designed to evaluate structural materials commonly encountered in the civil and construction environments. Basic beam, truss and frame experiments will be conducted. Standard laboratory and field tests for typical materials such as block, brick, asphalt, concrete, steel and timber will be performed. Three laboratory hours per week. (Fall)

Proposed Text:

Departmental and/or Instructor prepared laboratory manual. Experiments based on the TQ Structures laboratory apparatus and equipment.

Proposed Course Outline:

Week 1: Los Angeles Abrasion Test
Week 2: Evaluation of Clay Brick
Week 3: Marshall Stability Test
Week 4: Bending Moments in a Beam
Week 5: Shear Force in a Beam
Week 6: Deflections of Beams and Cantilevers
Week 7: Bending Stress in a Beam
Week 8: Pin-Jointed Frameworks
Week 9: Three-Pinned Arch
Week 10: Two-Pinned Arch
Week 11: Fixed Arch
Week 12: Continuous and Indeterminate Beams
Week 13: Redundant Truss
Week 14: Frame Deflections and Reactions
Week 15: Buckling of Struts
PROPOSED CLASS DESCRIPTION AND OUTLINE
ETCE 3271L – BUILDING SYSTEMS LABORATORY

Proposed Catalog Description:

ETCE 3271L. Building Systems Laboratory. (1) (W) Prerequisite or Corequisite: ETCE 3271. Laboratory exercises demonstrating the basic theory and practical application of heating, ventilation, air conditioning, plumbing and electrical systems in construction. Three laboratory hours per week. (Spring)

Proposed Text:

Departmental and/or Instructor prepared laboratory manual. Experiments based on Armfield Limited laboratory apparatus and equipment.

Proposed Course Outline:

Week 1: Technical Report Writing
Week 2: Bernoulli’s Theorem Demonstration
Week 3: Pipe Network Pressure Losses
Week 4: Centrifugal Pump Demonstration
Week 5: Series/Parallel Pump Demonstration
Week 6: Expansion Process of a Perfect Gas
Week 7: Axial Fan Demonstration
Week 8: Centrifugal Fan Demonstration
Week 9: Centrifugal Compressor Demonstration
Week 10: Basic Water Cooling Tower
Week 11: Refrigeration
Week 12: Heat Exchangers
Week 13: Solar Energy Systems
Week 14: Process Control System Demonstration
Week 15: Green Construction Technologies
PROPOSED CLASS DESCRIPTION AND OUTLINE
ETCE 4073 – SPECIAL TOPICS CIVIL ENGINEERING TECHNOLOGY

Proposed Catalog Description:

ETCE 4073. Special Topics – Civil Engineering Technology. (1-4) Prerequisite: senior standing and consent of instructor. A study of new and emerging technical topics pertinent to the field of civil engineering technology. May be repeated for credit. (On demand)

Proposed Text:

Text to be selected by instructor based on course topic.

Proposed Course Outline:

Course outline to be established by instructor based on course topic.
Figure 1.7: A typical graph showing the relationship between temperature and moisture content in a soil sample.

**Proposed Class Description and Outline**

**ETCE 4344 – APPLIED HYDROLOGY AND STORM WATER MANAGEMENT**

*Proposed Catalog Description:*

**ETCE 4344. Applied Hydrology and Storm Water Management. (3)** Prerequisite: ETCE 3242. Introduction to basic hydrologic principles, prediction of runoff, design of storm water systems and controls, and the application of best management practices. *(On demand)*

*Proposed Text:*

- Or

*Proposed Course Outline:*

- Week 1: Introduction to Stormwater Conveyance Modeling and Design
- Week 2: System Components, Models, and the Design Process
- Week 3: Fundamental Laws and Units
- Week 4: Modeling Rainfall
- Week 5: Modeling Runoff
- Week 6: Flow in Closed Conduits
- Week 7: Flow in Open Channels
- Week 8: Design of Open Channels
- Week 9: Culvert Design
- Week 10: Gutter Flow and Inlet Design
- Week 11: Storm Sewer Pipe System and Outlet Design
- Week 12: Stormwater Detention
- Week 13: Stormwater Pumping
- Week 14: Regulatory and Environmental Issues
- Week 15: Stormwater Quality Management