

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

NEW UNDERGRADUATE CURRICULUM PROPOSAL

COURSE AND CURRICULUM PROPOSAL FROM: ENGINEERING TECHNOLOGY AND
CONSTRUCTION MANAGEMENT**Establishment of New Undergraduate Concentrations in Fire Safety Engineering
Technology****A. PROPOSAL SUMMARY AND CATALOG COPY.****A.1 Proposal Summary**

The Department of Engineering Technology and Construction Management proposes the creation of two concentrations within the Fire Safety Engineering Technology (FSET) undergraduate program: a Fire Safety concentration and a Fire Protection concentration. The 125 credit hour Fire Safety concentration will encompass the curriculum currently in place within the FSET program and will retain its emphasis on preparing students who are or plan to be engaged in non-technological activities in the fire services, emergency services, and safety fields of both public and private entities. The 125 credit hour Fire Protection concentration will incorporate new courses that will prepare fire protection professionals to use modern fire protection engineering methodologies, techniques and tools for fire protection analysis and design, fire investigation, industrial fire safety, key infrastructure security, safety risk assessment, and other fire safety related engineering and technological matters.

The two concentrations have a common 83 credit hour core as follows:

CHEM 1251 Principles of Chemistry I	3 credits
ENGL 1101 English Composition	3 credits
ENGL 1102 Writing in the Academic Community	3 credits
LBST 110X Arts and Society	3 credits
LBST 2101 Western Culture and Historical Awareness	3 credits
LBST 2102 Global and Intercultural Connections	3 credits
LBST 221X Ethical Issues and Cultural Critique	3 credits
ETFS 1120 Fundamentals of Fire Protection	3 credits
ETFS 1232 Fire Protection Hydraulics & Water Supply	3 credits
ETFS 2124 Fundamentals of Fire Prevention	3 credits
ETFS 2126 Fire Investigation	3 credits
ETFS 2132 Building Construction for Fire Protection	3 credits
ETFS 2144 Fire Protection Systems	3 credits
ETFS 2264 Fire Behavior and Combustion	3 credits
ETFS 2264L Fire Behavior and Combustion Lab	1 credit
ETFS 3103 Principles of Fire Behavior	3 credits
ETFS 3113 Building Fire Safety	3 credits
ETFS 3123 Industrial Hazards and Electricity	3 credits
ETFS 3144 Active Fire Protection	3 credits
ETFS 3233 Intro to Performance-based Fire Safety	3 credits

ETGR 1100 Engineering Technology Computer Applications	3 credits
ETGR 1103 Technical Drawing I	2 credits
ETGR 1201 Introduction to ET	2 credits
ETGR 3071 ET Professional Seminar	1 credit
ETGR 3222 Engineering Economics	3 credits
PHYS 1101 Introductory Physics I	3 credits
PHYS 1101L Introductory Physics I Lab	1 credit
PHYS 1102 Introductory Physics II	3 credits
PHYS 1102L Introductory Physics II Lab	1 credit
STAT 1220 Elements of Statistics	3 credits
Social Science Elective	3 credits

The Fire Safety concentration requires an additional 42 credit hours as follows:

ETFS 1252 Fire Protection Law	3 credits
ETFS 2230 Hazardous Materials	3 credits
ETFS 3124 Risk Management for Emergency Service	3 credits
ETFS 4123 Community Threat Assessment & Mitigation	3 credits
ETFS 4243 Research Methodology	3 credits
ETFS 4323 Advance Fire Service Administration	3 credits
MATH 1100 College Algebra and Probability	3 credits
POLS 3119 State and Local Government	3 credits
POLS 3126 Administrative Behavior	3 credits
PSYC 2171 Intro to Industrial/Organizational Psychology	3 credits
PSYC 3174 Organizational Psychology	3 credits
Major Electives	9 credits

The Fire Protection concentration requires an additional 42 credit hours as follows:

ETFS 3103L Principles of Fire Behavior Laboratory	1 credit
ETFS 3242L Fire Testing and Measurement Laboratory	1 credits
ETFS 3283 Fire Hazard Analysis	3 credits
ETFS3344 Introduction to Structural Fire Safety	3 credits
ETFS3344L Introduction to Structural Fire Safety Laboratory	1 credit
ETGR 2101 Applied Mechanics I	3 credits
ETGR 2106 Electrical Circuits	3 credits
ETGR 2171 Engineering Analysis I or MATH 1121 Calculus (ET)	3 credits
ETGR 2272 Engineering Analysis II	3 credits
ETGR 3171 Eng. Analysis III or ETGR 4272 Eng. Analysis IV	3 credits
ETME 3123 Strength of Materials or ETGR 2102 Applied Mechanics II	3 credits
ETME 3133 Fluid Mechanics	3 credits
ETME 3143 Thermodynamics	3 credits
ETME 3244 Applied Heat Transfer	3 credits
MATH 1103 Pre-calculus Math for Science and Engineering	3 credits
Major Elective	3 credits

In order to establish the concentrations, the following five new courses will be created:

ETFS3103L Principles of Fire Behavior Laboratory (W)	1 credit
ETFS 3242L Fire Testing and Measurement Laboratory (W)	1 credits
ETFS 3283 Fire Hazard Analysis	3 credits
ETFS3344 Introduction to Structural Fire Safety	3 credits
ETFS3344L Introduction to Structural Fire Safety Laboratory (W)	1 credit

The writing intensive (W) courses have been reviewed by the University College and their approvals are attached in the Appendix. As a point of clarification, it should be noted that in addition to the above courses, the following four new courses are being submitted for approval under a separate short form curriculum proposal being processed concurrently with this proposal. The reason for the separate proposals is that the new courses will impact all of the programs within the Department of Engineering Technology and Construction Management not just the FSET program.

ETGR 2171 Engineering Analysis I	3 credits
ETGR 2272 Engineering Analysis II	3 credits
ETGR 3171 Engineering Analysis III	3 credits
ETGR 4272 Engineering Analysis IV	3 credits

In addition to the new courses, the titles and/or course descriptions for the following courses will be modified. The accompanying short form curriculum proposal has been attached in the Appendix.

ETFS 3233 Applied Fire Engineering Design and Analysis to <i>ETFS 3233 Introduction to Performance-Based Fire Safety</i>
ETFS 4123 Command and Control of Major Disasters to <i>ETFS 4123 Community Threat Assessment and Mitigation</i>
ETFS 4243 Research Investigation to <i>ETFS 4243 Research Methodology</i>

Finally, the FSET program proposes to change the chemistry requirement within the common core courses from CHEM 1111 Chemistry in Today's Society to CHEM 1251 Principles of Chemistry I. Approval from the Chemistry Department concerning this proposed change is attached in the Appendix.

A.2 Proposed Catalog Copy of New and Modified Courses

The proposed catalog copy for the new and modified FSET courses is shown below. Due to the extensive nature of the proposed changes, the remainder of the proposed catalog copy has been included in the Appendix.

ETFS 3103L. Principles of Fire Behavior Lab (1) (W). Prerequisite or corequisite: ETFS 3103 or permission of department. This course provides overall instruction and hands-on experience with fire science related to the material discussed in the Principles of Fire Behavior course. The

objective is to expose students to fire experiments such as standard fire tests and state-of-the-art measurements, and thus enhance their understanding of fire behavior. (Spring) (Alternate years)

ETFS 3233. Introduction to Performance-Based Fire Safety (3). Prerequisite: ETFS 3103. This course provides an overview of the relevant performance-based fire protection engineering tools and skills, and presents the basic concepts and a systematic approach for performance-based fire safety design. The tools can also be used in the investigation and reconstruction of fire incidents. (Spring) (Alternate years)

ETFS 3242. Fire Testing and Measurement Lab (1) (W). Prerequisites: Must be in the senior year in the fire protection concentration. This course provides students with opportunities in learning current fire testing and measurement methods and instrumentations, and conducting research to tackle fire safety related real-world problems. Students are afforded unlimited possibilities for learning and achievement. (Fall)

ETFS 3283. Fire Hazard Analysis (3). Prerequisites: ETFS 3103, ETME 3244 or permission of department. Elements of quantitative fire hazard analysis will be discussed. Applications of deterministic tools for fire hazard analysis will be reviewed. Simple engineering calculations and various types of computer models will be presented, and their use for predictions of fire conditions and people evacuation will be studied using examples. (Spring) (Alternate years)

ETFS 3344. Introduction to Structural Fire Safety (3). Prerequisites: ETFS 3103 and ETME 3123. This course provides basic knowledge needed for structural fire safety design and analysis. Course topics include design philosophies and methods in fire safety engineering, approaches for structural design for fire safety, behavior of compartment fires, and behavior of structural materials in fire. This course also requires laboratory sessions in the UNCC Fire Safety Laboratory. (Fall) (Alternate years)

ETFS 3344L. Introduction to Structural Fire Safety Laboratory (1) (W). Prerequisite or corequisite: ETFS 3103 and ETME 3123. This course provides overall instruction and hands-on experience with fire science related to the material discussed in the Introduction to Structural Fire Safety course. The objective is to expose students to structural fire experiments such as standard structural fire tests and state-of-the-art measurements, and thus enhance their understanding of structural fire behavior of materials. (Fall) (Alternate years)

ETFS 4123. Community Threat Assessment and Mitigation. (3) This course focuses on the emergency service's responsibility while conducting major operations involving multi-alarm incidents, natural and man-made disasters that may require interagency or jurisdictional coordination. Emphasis is on threat assessment and mitigation strategies of potential large scale disasters including but not limited to earthquakes, hurricanes, terrorism, hazardous materials releases, tornadoes, and floods. Topics include fireground decision making, advanced incident command, command and control, safety, personnel accountability, hazard preparedness, mitigation, response, recovery, evacuation, sheltering and communications.

ETFS 4243. Research Methodology. (W,O) (3) Application of practical, up-to-date review of fire research and its application. The transfer of research and its implications for fire prevention

and protection programs are addressed. Development of a student project and a written report in a specified area in fire administration or fire science technology with faculty supervision. Analytical modeling, technical research, oral and written reporting of progress and findings are required.

B. JUSTIFICATION.

B.1 Need Analysis

Fire protection engineers (FPEs) are in high demand and short supply on both national and regional levels. Fire protection engineering programs in the U.S., both graduate and undergraduate, produce approximately 60 graduates annually. A recent survey conducted by the Society of Fire Protection Engineers (SFPE) showed that, within the next fifteen years, an average of 115 SFPE member engineers per year may leave the profession¹. This study only surveyed SFPE members, not all practicing FPEs. Current output of graduating FPEs doesn't even come close to meeting this demand. An overwhelming majority of large FPE employers indicated they have difficulty recruiting enough qualified FPEs¹. With fire protection (FP) firm growth rates conservatively averaging 10% per year², the ratio of career positions to new graduates is on the order of four to one. Although the economic forecast calls for more uncertainty, increasing awareness of the role and value of the fire protection engineer will help maintain this supply-and-demand metric^{2,3}. Similar suggestions were made by the FSET advisory board members during two recent board meetings at UNC Charlotte. The advisory board members come from large local companies in North Carolina that employ FP engineers.

In addition, there are two groups of students currently attending the FSET program: (1) Students aspiring a career in the administration and management areas of fire, emergency, and safety services, and (2) students desiring a career requiring enhanced engineering analysis and design in fire protection engineering and other fire safety related fields. We thus have two distinct student audiences requiring two very distinct educational needs. The existing Fire Safety Engineering Technology concentration meets the needs for the first group of students. Therefore, a new Fire Protection Engineering Technology concentration is needed for the second group of students. This concentration will prepare students to perform fire protection engineering analysis, design, and research. It will also lead to professional engineering licensure in fire protection engineering.

Finally, the Department of Engineering Technology and Construction Management recently launched a new Master of Fire Protection and Administration (MFPA) graduate program. The proposed Fire Protection concentration will provide student streamlines for the new MFPA program.

¹ "SFPE – Higher Education Task Group Report.", by Dick Davis, SFPE Chair, SFPE Corp 100 Meeting, Las Vegas, June 1, 2008.

² "It's a great time to be a fire protection engineer". In *Careers in Fire Protection Engineering*, 2008: 16-20. The Society of Fire Protection Engineers (SFPE). Online version can be accessed at www.FPEmag.com/Careers.

³ "Demand for life-saving fire protection engineers exceeds supply as the need for more personnel continues to rise." SFPE News, July 22, 2008. Article is available at: <http://www.careersinfireprotectionengineering.com>.

In summary, the proposed new Fire Protection concentration will help produce more FPEs to meet national and regional demands, will serve FSET students better, and will also provide students for the newly launched MFPA graduate program.

B.2 Prerequisites for Courses

The prerequisites for the new courses are identified in the Proposed Catalog Copy section of this proposal. They include Calculus, Thermodynamics, Fluid Dynamics, and Heat Transfer for higher level fire protection courses such as Principles of Fire Behavior, Fire Hazard Analysis, and Structural Fire Safety. The introduction of the new courses into the concentration and their use as prerequisites will allow the necessary quantitative treatment of fire protection courses.

B.3 Course Numbering

The course numbering is consistent with the level of academic advancement of students for whom it is intended.

B.4 Effect on current programs and instruction

The proposed new FP concentration will diversify the FSET program to meet students' needs. It will improve the quality of both concentrations, allowing the FS concentration students to concentrate more on qualitative issues, and preparing the FP concentration students to reach their engineering and technologically oriented professional goals. With two concentrations clearly defined, the instructor can choose topics according to the needs or requirements of each concentration. Both the instructors and students can benefit from offering the right courses to the right students. All new FP courses will help improve the MFPA program as well. Students intending to enroll in the MFPA program, but coming from a field other than FP, can take the new FP courses in preparation for the graduate program.

C. IMPACT.

1. The primary group of students served by this proposal will be those undergraduate students who enroll in the FSET program and choose the Fire Protection Engineering Technology concentration.
2. The new concentration will strengthen the existing Fire Safety Engineering Technology undergraduate program, the Master of Fire Protection and Administration graduate program, and other degree programs in Engineering Technology. The proposed FP concentration will strengthen other engineering programs at UNC Charlotte. For example, the creation of the new courses for the fire protection concentration may be more attractive to other students in the College of Engineering who wish to broaden their education in fire protection and to increase their employment opportunities in fire protection engineering.
 - a. Once the FP concentration is fully established, the required courses will be offered once a year.
 - b. The delivery of the new FP concentration courses will not affect the delivery of the existing undergraduate courses.
 - c. Anticipated enrollment in the courses should be approximately 15- 20 students.

d. Enrollment in the new FP concentration courses will have only a limited effect on enrollment in existing undergraduate courses. Existing FS concentration courses may see a slight initial drop in enrollment as FSET students migrate to the new FP concentration. However, anticipated enrollment growth will quickly mitigate this trend. On the other hand, non-ETFS courses in the FP concentration will experience a slight increase in enrollment of approximately 15 to 20 students. This enrollment growth is considered to be manageable with the Department's current resources.

e. N/A.

f. Proposed changes to the catalog copy are attached in the Appendix.

D. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

1. Personnel

a. Specify requirements for new faculty, part-time teaching, student assistant and/or increased load on present faculty.

No new faculty members will be required to adequately deliver the program. Existing faculty in the Fire Safety Engineering Technology program will be able to teach the new courses. No adverse effect is anticipated on current faculty loads.

b. List by name qualified faculty members interested in teaching the course(s).

Jozef Urbas, Associate Professor
 Aixi Zhou, Assistant Professor
 Jeffrey Kimble, Associate Professor
 David Murphy, Associate Professor
 Nan Byars, Professor
 Peter Schmidt, Assistant Professor
 Ronald Priebe, Associate Professor
 Ahmad Sleiti, Assistant Professor
 Patty Tolley, Associate Professor

2. Physical Facility

The proposed program will share facilities with the existing Fire Safety Engineering Technology (FSET) program in the Smith Building and the Fire Laboratory located on Shopton Road. The FSET program already has an established fire research laboratory. The Laboratory houses several pieces of state of the art fire tests apparatus such as a Cone Calorimeter, an Intermediate Scale Calorimeter (ICAL), a Lateral Ignition and Flame Spread Test, a Furniture Calorimeter and an intermediate scale furnace equipped with load frames. The ICAL is a unique test apparatus and UNC Charlotte has one of the five ICALs currently used in the United States. In addition, the program recently invested in a structural fire

testing facility, one of only a few at U.S. academic institutions. An additional laboratory for small scale fire testing is in development in the Smith Building.

3. Equipment and Supplies

Existing equipment and supplies are adequate.

4. Computer

Existing information technology services and engineering computing capabilities will need to be upgraded with five standalone state-of-the-art workstations for computational fluid dynamics fire modeling, evacuation modeling, finite element fire resistance computations, and other fire modeling.

5. Audio-Visual.

No new resources will be needed as existing resources are adequate.

6. Other Resources

Other additional resources are not required.

7. Indicate source(s) of funding for new/additional resources required to support this proposal.

Existing facilities and equipment are in place. Any additional new facilities or equipment will be funded through normal university funding sources to include projected funding from RFPs from General Administration. Supplemental funding from public and private sources to include fire protection industry support will be utilized for program enhancements.

E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

1. Library Consultation

Library holdings are adequate to support the proposal prior to its leaving the department. A copy of *Consultation on Library Holdings* is attached.

2. Consultation with other departments or units

List departments/units consulted in writing and dates consulted.

The Chemistry Department was consulted concerning CHEM 1251 on January 25, 2012

Summarize results of consultation and attach correspondence.

The Chemistry Department approved the proposal.

F. INITIATION AND CONSIDERATION OF THE PROPOSAL

1. Originating Unit

Briefly summarize action on the proposal in the originating unit including information on voting and dissenting options.

The Department of Engineering Technology unanimously approved the proposal and it was forwarded to the College of Engineering Academic Policy and Curriculum Committee on February 8, 2011.

2. Other Considering Units

Briefly summarize action on the proposal by each considering unit including information on voting and dissenting options.

The College of Engineering Academic Policy and Curriculum Committee (CEAPCC) approved the proposal on April 24, 2011.

G. ATTACHMENTS

1. Relevant documentation of consultations with other units.

Library Consultation – 1/14/09

Chemistry Consultation – 1/12/12

University College Consultation – 3/30/10

2. Undergraduate courses course outline(s) including basic topics to be covered and suggested textbooks and reference materials with dates of publication.

ETFS 3103L Principles of Fire Behavior Laboratory

ETFS 3233 Introduction to Performance-Based Fire Safety

ETFS 3242L Fire Testing and Measurement Laboratory

ETFS 3283 Fire Hazard Analysis

ETFS 3344 Introduction to Structural Fire Safety

ETFS 3344L Introduction to Structural Fire Safety Laboratory

3. Proposed catalog copy

4. Short form proposal to revise ETFS course names and descriptions



Consultation on Library Holdings

To: Aixi Zhou
From: Alison Bradley
Date: 1/14/09
Subject: Fire Protection Engineering Technology track

Summary of Librarian's Evaluation of Holdings:

Evaluator: Alison Bradley Date: 1/14/09

Check One:

- 1. Holdings are superior
2. Holdings are adequate (checked)
3. Holdings are adequate only if Dept. purchases additional items.
4. Holdings are inadequate

Comments:

Atkins Library's holdings should be adequate to support study and research in fire protection engineering technology at the undergraduate level, particularly since this program reflects a more focused track within a currently existing course of study. The library currently holds over 1,100 books and government documents with relevant subject headings, and over 200 print and electronic periodical holdings (see second page for details). All students in the program will have access to a subject specialist librarian as well as general support from the library's public services staff. Students will also have access to interlibrary loan to request material not held by the UNCC libraries, and to the National Learning Academy through the USFA-NFA.

Alison Bradley (handwritten signature)

Evaluator's Signature

1/14/09

Date

Summary of relevant holdings by LC subject heading

Subject Heading	Total Catalog Entries	Books and Government Documents	Periodicals	Electronic Resources
Fire Prevention	292	281	7	26
Fires and Fire prevention (subheading)	366	351	0	112
Fire Protection Engineering	18	16	0	2
Building, Fireproof	33	30	0	0
Fire Extinction	143	122	3	29
Fireproofing/Fireproofing Agents	62	33	0	2
[Specific fire types] -- Prevention and Control	135	126	1	27
Firetesting	118	113	0	5
Fire Resistant Materials	17	17	0	1
Firescaping	4	4	0	0
Flame Spread	28	28	0	2
Totals	1216	1121	11	206

Revised 1/14/2009
OAA jdp

From: [Kimble, Jeff](#)
To: [Gehrig, Bruce](#); [Brizendine, Tony](#)
Subject: FW: Proposal consultation from Eng. Tech.
Date: Friday, January 27, 2012 12:01:36 PM

Bruce, Tony,

I have yet to receive a separate response about the proposal, but note in the email she indicates Chemistry has no problems with our students taking the Chem 1251. I have highlighted Kathy's comment. Will this be ok for the committee. I think Janet said an email was sufficient.

Jeff

From: Asala, Kathy
Sent: Wednesday, January 25, 2012 12:17 PM
To: Kimble, Jeff
Cc: Donovan-Merkert, Bernadette
Subject: RE: Proposal consultation from Eng. Tech.

Jeff,

I do remember discussing the idea of having FSET majors take CHEM 1200 with someone at an AAIT meeting last year. I didn't realize CHEM 1200 had become the recommended path for them. I believe I also told this person that it would be helpful for me to know more about the FSET curriculum in order to make the most appropriate recommendation of which introductory chemistry course FSET majors should take. I thought she was going to follow-up with me on this, but I never heard from her.

My main question to you was a clarification of which FSET majors will be registering for CHEM 1251 in the future. **I have no objections to all of the FSET majors being required to take CHEM 1251**, but it is important for the Chemistry Department to know how many new students will be registering for the course so that we can plan accordingly. Do I understand you correctly...you predict that there will be approximately 15 FSET majors annually that will take CHEM 1251 once the new concentration is approved?

Thank you,
Kathy

Kathryn S. Asala, Ph.D. | Undergraduate Coordinator
UNC Charlotte | Department of Chemistry
9201 University City Blvd. | Charlotte, NC 28223
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From: Kimble, Jeff

Sent: Tuesday, January 24, 2012 3:28 PM
To: Asala, Kathy
Subject: RE: Proposal consultation from Eng. Tech.

Kathy,

My student advisor indicated you said in a meeting on Feb 18th our current students should be taking Chem 1200. So that is currently what they are being to advised to register for. Has your group had a chance to discuss this request? The Univ. College and Curriculum committee is meeting is this week and we would like to have them discuss this proposal.

Thank you,

Jeff

From: Asala, Kathy
Sent: Friday, January 20, 2012 5:37 PM
To: Kimble, Jeff
Cc: Donovan-Merkert, Bernadette
Subject: RE: Proposal consultation from Eng. Tech.

Jeff,

It is my understanding that Fire Safety ET majors currently are required to take CHEM 1111. Is this correct? If it is correct, will most of the Fire Safety ET majors still take CHEM 1111 and it is only the students who choose to pursue the new concentration that will take CHEM 1251? I am trying to understand how the ~90 Fire Safety ET majors will be distributed in our introductory chemistry courses once the new concentration is approved.

Thank you,
Kathy Asala

Kathryn S. Asala, Ph.D. | Undergraduate Coordinator
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From: Donovan-Merkert, Bernadette
Sent: Friday, January 20, 2012 4:22 PM
To: Kimble, Jeff
Cc: Asala, Kathy
Subject: RE: Proposal consultation from Eng. Tech.

Hi Jeff,

Kathy Asala and some of my other colleagues may be contacting you with questions about the proposal.

Bernadette

Bernadette T. Donovan-Merkert, Ph.D. | Professor and Chair of Chemistry
Director, Nanoscale Science Ph.D. Program
UNC Charlotte | Department of Chemistry
9201 University City Blvd. | Charlotte, NC 28223
Phone: 704-687-4436 | Fax: 704-687-3151
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From: Kimble, Jeff
Sent: Friday, January 20, 2012 3:14 PM
To: Donovan-Merkert, Bernadette
Subject: RE: Proposal consultation from Eng. Tech.

Thank you!

Jeff

From: Donovan-Merkert, Bernadette
Sent: Friday, January 20, 2012 3:13 PM
To: Kimble, Jeff
Subject: RE: Proposal consultation from Eng. Tech.

Dear Jeff,

I will consult some of the faculty who teach CHEM 1251 and will get back with you in a few days.

Best wishes.

Bernadette

Bernadette T. Donovan-Merkert, Ph.D. | Professor and Chair of Chemistry
Director, Nanoscale Science Ph.D. Program
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From: Kimble, Jeff
Sent: Friday, January 20, 2012 3:11 PM
To: Donovan-Merkert, Bernadette
Subject: Proposal consultation from Eng. Tech.

Dr. Donovan-Merkert,

My name is Jeff Kimble and I serve as the program coordinator for the Fire Safety Engineering Technology program in the Engineering Technology Department here at UNC Charlotte. We are proposing to add an additional concentration to our existing Fire Safety ET degree. As with our existing degree program, this concentration would also include a requirement for the students to take Chemistry 1251. Since this proposal has potential to impact your department, I would like to solicit your thoughts on whether or not you could support this proposal and thusly, the added number of new students in your classes.

It is our estimate that this proposed concentration will be a small number of students, probably no more than fifteen in any given year that would be enrolling in Chemistry 1251. Our current student population in Fire Safety ET is about ninety students and we have approximately five that are interested in pursuing this proposed concentration. Based on the interest level from current students, I really do not think it will be a large number of additional students who will come to us specifically for this concentration and dramatically increase the numbers needing the CHEM1251 course.

I will be happy to answer any questions or try to address your concerns in regard to this proposal.

I thank you for your consideration of this request and look forward to hearing from you

Sincerely

Jeff Kimble

687 411



UNC CHARLOTTE

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TO: Dr. Jay Raja
Senior Associate Provost

FROM: John Smail
Dean, University College

DATE: March 30, 2010

RE: Pre-Approval of "Introduction to Structural Fire Safety Laboratory"
(ETFS 3344 L) as "W" course

(Upon formal action by the Faculty Chair Committee to create this course.)



I received a proposal from Dr. Aixi Zhou, Department of Engineering Technology, to pre-approve "Introduction to Structural Fire Safety Laboratory" (ETFS 3344 L) as a course that can be applied to the Writing Intensive Goal associated with the University's General Education Program. It is clear from the proposal that this course places a great emphasis on developing students' writing skills. Therefore, I am happy to designate ETFS 3344L as a "W" course upon formal action by the Faculty Chair Committee to create this course. This approval should be effective for the Fall 2010 semester.

cc: Dr. Aixi Zhou
Dr. Anthony Brizendine
Dr. Jeff Kimble
Dr. Joe Urbas
Dr. Kim Harris
Academic Affairs



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TO: Dr. Jay Raja
Senior Associate Provost

FROM: John Smail
Dean, University College

DATE: March 30, 2010

RE: Pre-Approval of "Fire Testing and Measurement Lab"
(ETFS 3242 L) as "W" course

A handwritten signature in black ink, appearing to read "John Smail".

(Upon formal action by the Faculty Chair Committee to create this course.)

I received a proposal from Dr. Aixi Zhou, Department of Engineering Technology, to pre-approve "Fire Testing and Measurement Lab" (ETFS 3242 L) as a course that can be applied to the Writing Intensive Goal associated with the University's General Education Program. It is clear from the proposal that this course places a great emphasis on developing students' writing skills. Therefore, I am happy to designate ETFS 3242 L as a "W" course upon formal action by the Faculty Chair Committee to create this course. This approval should be effective for the Fall 2010 semester.

cc: Dr. Aixi Zhou
Dr. Anthony Brizendine
Dr. Jeff Kimble
Dr. Joe Urbas
Dr. Kim Harris
Academic Affairs



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TO: Dr. Jay Raja
Senior Associate Provost

FROM: John Smail
Dean, University College

DATE: March 30, 2010

RE: Pre-Approval of "Principles of Fire Behavior Laboratory"
(ETFS 3103 L) as "W" course



(Upon formal action by the Faculty Chair Committee to create this course.)

I received a proposal from Dr. Aixi Zhou, Department of Engineering Technology, to pre-approve "Principles of Fire Behavior Laboratory" (ETFS 3103 L) as a course that can be applied to the Writing Intensive Goal associated with the University's General Education Program. It is clear from the proposal that this course places a great emphasis on developing students' writing skills. Therefore, I am happy to designate ETFS 3103 L as a "W" course upon formal action by the Faculty Chair Committee to create this course. This approval should be effective for the Fall 2010 semester.

cc: Dr. Aixi Zhou
Dr. Anthony Brizendine
Dr. Jeff Kimble
Dr. Joe Urbas
Dr. Kim Harris
Academic Affairs



University College


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TO: Dr. Jay Raja
Senior Associate Provost

FROM: John Smail
Dean, University College

DATE: March 30, 2010

RE: Approval of "Building Fire Safety " (ETFS 3113) as "W" course



I received a proposal from Dr. Aixi Zhou, Department of Engineering Technology, to approve "Building of Fire Safety (ETFS 3113) as a course that can be applied to the Writing Intensive Goal associated with the University's General Education Program. It is clear from the proposal that this course places a great emphasis on developing students' writing skills. Therefore, I am happy to designate ETFS 3113 as a "W" course. This approval should be effective for the Fall 2010 semester.

cc: Dr. Aixi Zhou
Dr. Anthony Brizendine
Dr. Jeff Kimble
Dr. Joe Urbas
Dr. Kim Harris
Academic Affairs

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3103L Principles of Fire Behavior Laboratory (1)

Course Description:

This course provides overall instruction and hands-on experience with fire science related to the material discussed in the Principles of Fire Behavior course. The objective is to expose students to fire experiments such as standard fire tests and state-of-the-art measurements, and thus enhance their understanding of fire behavior. (1) (Fall) (Alternate years)

Prerequisite: ETFS 3103 or permission of department.

Objectives: In this course students will basic principles of fire testing related to the ETFS 3103 course material. Upon completion the students should be able to:

- Understand and conduct standard ignition and flame spread tests
- Understand oxygen consumption calorimetry
- Understand and conduct tests on the Cone Calorimeter and Intermediate Scale Calorimeter
- Apply oxygen calorimetry to full-scale and fire re-creation testing

Probable textbooks or resources: Per Instructor.

Course Contents:

Week 1 Course introduction, introduction to a fire science laboratory
 Week 2 Laminar flames, diffusion flames, candle flame experiments
 Week 3 Temperature, heat flux measurements
 Week 4 Ignitability measurements
 Week 5 Flame spread measurements
 Week 6 Oxygen consumption concept
 Week 7 Mass loss rate measurements
 Week 8 Heat release rate measurements
 Week 8 Cone calorimeter
 Week 9 Intermediate Scale Calorimeter (ICAL)
 Week 10 Flame height, pool fires
 Week 11 Smoke and toxic gas measurements
 Week 12 Large scale testing, stages of fire development
 Week 12 Fire-recreation testing
 Week 13 Smoldering fires
 Week 14-15 Example of computer fire modeling

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3233 Introduction to Performance-Based Fire Safety (3)

Course Description:

This course provides an overview of the relevant performance-based fire protection engineering tools and skills, and presents the basic concepts and a systematic approach for performance-based fire safety design. The tools can also be used in the investigation and reconstruction of fire incidents. (3) (Fall) (Alternate years)

Prerequisite: ETFS 2124, ETFS 3103.

Textbook: *SFPE Engineering Guide to Performance-Based Fire Protection*, 2nd Edition, NFPA and SFPE, 2007, ISBN-10: 0-87765-789-0.

Reference Books: *Introduction to Performance-Based Fire Safety*, by R.L.P. Custer and B.J. Meacham, SFPE and NFPA, 1997, ISBN: 0-87765-421-2.

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Concepts of Performance-Based Design (PBD) for Fire Protection
2	PBD Fire Protection Analysis and Design Process
3	Project Scope, Goals, Objectives, and Performance Criteria
4	Design Fire Scenarios
5	Hazard, Risk and Failure Analysis
6-7	Modeling in PBD
8	Human Factors
9	Uncertainty and Safety Factors
10	Trial Designs
11	Documentation
12-15	Case Studies

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3242L Fire Testing and Measurement Laboratory (1) (W)

Course Description:

This course provides students with opportunities in learning current fire testing and measurement methods and instrumentations, and conducting research to tackle fire safety related real-world problems. Students are afforded unlimited possibilities for learning and achievement. (Fall)

Prerequisite: Must be in the senior year.

Textbook: *None. The course will rely on presentations, notes and documents.*

Reference Books: Per Instructor.

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Overview: Fire testing and measurement
2-3	Advanced temperature and heat flux measurement
4-5	Advanced calorimetry
6-7	Other selected fire testing and measurement topics (by faculty)
8-14	Research project assignment, project meetings and work
15	Project documentation, final report and presentation

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3283 Fire Hazard Analysis (3)

Course Description:

Elements of quantitative fire hazard analysis will be discussed. Applications of deterministic tools for fire hazard analysis will be reviewed. Simple engineering calculations and various types of computer models will be presented, and their use for predictions of fire conditions and people evacuation will be studied using examples. (3) (Fall) (Alternate years)

Prerequisite: ETFS 3103 and ETME 3244 or permission of department.

Objectives: In this course students will learn basic principles of fire hazard analysis. Upon completion the students should be able to:

- Understand the meaning of fire scenario
- Understand heat release rate
- Apply zone and field fire models for assessment of the effects of fire
- Apply evacuation models for prediction of evacuation times

Probable textbooks or resources: The SFPE Handbook of Fire Protection Engineering Edited by DiNunno, Philip J. et al., Society of Fire Protection Engineers

Course Contents:

Week 1	Course introduction
Week 2	Heat release rates
Week 3	Estimating temperatures in compartment fires
Week 4	Smoke and heat venting
Week 4	Compartment fire modeling
Week 5	Zone computer fire modeling
Week 6	Examples of zone modeling
Week 7-9	Modeling enclosure fires using CFD
Week 10-12	People in fires
Week 13-14	Modeling of people movement

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3344 Introduction to Structural Fire Safety (3)

Course Description:

This course provides the knowledge needed for structural fire safety design and analysis. Course topics include design philosophies and methods in fire safety engineering, principles of and approaches for structural design for fire safety, behavior of compartment fires, behavior of structural materials in fire, and structural fire safety of typical materials and their components. This course also requires laboratory sessions in the UNCC Fire Safety Laboratory. (4) (Spring) (Alternate years)

Prerequisite: ETFS 3103, ETME 3123.

Textbook: *Fire Safety Engineering: Design of Structures (2nd Ed.)*, J.A. Purkiss, Butterworth-Heinemann, 2006.

Reference Books: *Structural Design for Fire Safety*, A.H. Buchanan, John Wiley & Sons, 2001.

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Introduction to Structural Fire Safety
2	Design Philosophies for Structural Fire Safety
3	Prescriptive Approach for Structural Fire Safety
4	Behavior of Compartment Fires
5	Calculation Approach for Structural Fire Safety
6	Properties of Materials at Elevated Temperatures
7	Structural Fire Safety of Concrete Elements
8	Structural Fire Safety of Steel Elements
9	Structural Fire Safety of Composite Elements
10	Structural Fire Safety of Timber Elements
11-12	Structural Fire Safety of Masonry, Aluminum, Plastics, and Glass
13-15	Structural Fire Safety of Special Structures

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE
The William States Lee College of Engineering
 Fire Protection Engineering Technology

ETFS 3344L Introduction to Structural Fire Safety Laboratory (1)

Course Description:

This course provides overall instruction and hands-on experience with fire science related to the material discussed in the Introduction to Structural Fire Safety course. The objective is to expose students to structural fire experiments such as standard structural fire tests and state-of-the-art measurements, and thus enhance their understanding of structural fire behavior of materials.
 (Spring) (Alternate years)

Prerequisite: ETFS 3103, ETME 3123.

Textbook: *Fire Safety Engineering: Design of Structures (2nd Ed.)*, J.A. Purkiss, Butterworth-Heinemann, 2006.

Reference Books: *Structural Design for Fire Safety*, A.H. Buchanan, John Wiley & Sons, 2001.

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Introduction to Structural Fire Testing
2-4	Thermomechanical Characterization of Materials at Elevated Temperatures and Fire
5-8	Structural Fire Testing for Non-charring Materials
9-12	Structural Fire Testing for Charring Materials
13-15	Structural Fire Testing of Special Structures

Department of
**Engineering Technology and Construction
 Management**

et.uncc.edu

Engineering and technical education have undergone considerable change in the last 40 years. The complexities of space exploration, nuclear power, communications systems, environmental control, information processing, transportation systems, fire protection, construction management, and manufacturing have demanded a great increase in the involvement of professional engineers in theoretical and analytical work. This has resulted in a much greater emphasis upon research and development, science, and mathematics in professional engineering curricula. At the same time, after the more complex devices and systems have been engineered, their design, development, and operation require the sophisticated knowledge and skills of what might be called the "applied engineering sciences." Programs dedicated to filling this need exist all over the United States. The aim and content of these programs are distinctly different from professional engineering curricula.

To provide the appropriate distinction from both theoretical-professional engineers and from engineering technicians who are graduated from two-year community and technical colleges, the designation "engineering technologist" is employed to describe the graduates of four-year applied engineering or "engineering technology" curricula. The department is committed to producing competent graduates that satisfy the needs of employers in North Carolina and throughout the United States.

DEGREE PROGRAMS

The department offers curricula leading to the Bachelor of Science in **Construction Management (BSCM)** and the Bachelor of Science in Engineering Technology (BSET) degrees. In addition to the BSCM, four disciplines of study are available in Engineering Technology: **Civil Engineering Technology, Electrical Engineering Technology, Fire Safety Engineering Technology (with concentrations in Fire Safety or Fire Protection), and Mechanical Engineering Technology.**

Students may enroll in our programs in several ways: 1) as freshmen; 2) as transfers without an approved Associate of Applied Science (AAS) degree in engineering technology, construction management, or fire protection; or 3) as upper division 2+2 transfers after completing a two-year AAS degree in a relevant engineering technology, construction management, or fire protection curriculum at a community or technical college. *Incoming students with an AAS degree generally receive Junior class standing, with 64 semester credit hours applied toward the BSET or BSCM degree.*

Construction Management and Engineering Technology students learn through applied technical courses and hands-on laboratories where they interact with experienced professors with many years of real-world engineering, design, project management, and product development experience. Graduation with a BS degree in Construction Management (BSCM) or Engineering Technology (BSET) opens the door to many exciting and challenging professional careers. Graduates choose from a variety of exciting career options where they enjoy productive professional careers with exceptional employment rates and excellent salaries.

EMPLOYMENT OPPORTUNITIES FOR GRADUATES

Graduates of our programs can be found in every sector of the global economy. Examples of employment opportunities and examples of recent job titles are provided below for each program.

CIVIL ENGINEERING TECHNOLOGY

Civil Engineering Technology (CIET) graduates find employment in a wide range of positions in construction, surveying, engineering and architectural firms; local, state and national government; environmental and public

health agencies; state departments of transportation and highways; and private business and industry. Specific job titles of recent graduates include transportation technician, highway technician, engineer-in-training, materials supervisor, surveying crew chief, civil engineering detailer/designer, office engineer, construction estimator or planner, engineering assistant, project engineer and assistant project manager.

CONSTRUCTION MANAGEMENT

Construction Management (CM) graduates plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial, and industrial structures, roads, bridges, wastewater treatment plants, and schools and hospitals. Construction managers may oversee an entire project or just part of a project. They often work with or for owners, engineers, architects, and others who are involved in the construction process. Construction managers evaluate and help determine appropriate construction delivery systems and the most cost-effective plan and schedule for completing the project.

ELECTRICAL ENGINEERING TECHNOLOGY

Electrical Engineering Technology (ELET) graduates find employment in many sectors of the economy. Almost any aspect of communications, electronic instrumentation, computer applications, computer networking, electric power generation and distribution, or consumer electronics has a need for graduates with understanding of the applications of electrical technology. A few examples are systems administrator for networked computer systems, systems design for a telecommunications company, avionics control systems for aircraft programs, applications design for HVAC and building power-control systems.

FIRE SAFETY ENGINEERING TECHNOLOGY

Fire Safety Engineering Technology (FSET) graduates find employment in numerous areas associated with fire protection to include prevention, suppression, building design and arson investigation, emergency preparedness, safety analysis and mitigation. The FSET program stresses the importance of personal communication skills and the ability to function in a team environment. Some typical job titles of recent graduates include firefighter, arson investigator, fire prevention officer, fire inspector, and fire captain.

MECHANICAL ENGINEERING TECHNOLOGY

Mechanical Engineering Technology (MET) graduates use the principles of energy, materials, and mechanics to design, build, test and maintain a wide variety of machines, processes, and systems with employment in the automotive, aerospace, alternative energy and other high-tech industries. METs work in areas such as computer-aided design, plant maintenance or production, research and development, or as laboratory technicians, production assistants, manufacturing or quality control engineers, product and materials testing technologists, or applications engineers.

SPECIALIZED ACCREDITATION

The Civil, Electrical, and Mechanical Engineering Technology programs are accredited by the Technology Accreditation Commission (TAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202, Phone: 410-347-7700.

DISTANCE EDUCATION OPTIONS

In addition to the on-campus programs, the upper division of the BSET programs in **Electrical Engineering Technology** and **Fire Safety Engineering Technology** (excluding the Fire Protection concentration) are offered over the Internet to part-time students. This allows students who already hold an AAS degree to complete their junior and senior years of the BSET program at a distance. Students are required to come to the campus only for ELET laboratories. The ELET laboratories are currently offered on a schedule of Saturdays during the summer school sessions. Estimated completion time for the distance delivery of the junior and senior years is approximately four years, including summers since students generally take two courses per semester.

ENGINEERING TECHNOLOGY PROGRAM EDUCATIONAL OBJECTIVES AND OUTCOMES

PROGRAM EDUCATIONAL OBJECTIVES

These are statements that describe the expected accomplishments of graduates during the first few years *after* graduation.

The Department of Engineering Technology and Construction Management at UNC Charlotte is committed to providing the environment and expertise to ensure that its graduates make substantive contributions in their professional endeavors after graduation, both in the areas of technical proficiency and community involvement.

Accordingly, graduates of the BSET Civil, Electrical, Fire Safety, and Mechanical Engineering Technology programs and BSCM Construction Management program contribute to society as productive technologists and engaged citizens by:

- 1.) Applying general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems.
- 2.) Articulating technical material in a professional manner to potentially diverse audiences and in a variety of circumstances, employing effective oral and written strategies and techniques.
- 3.) Assuming leadership roles and contributing within team environments while modeling ethical, respectful, and professional behavior at all times.
- 4.) Recognizing and appreciating the environmental, societal, and fiscal impact of the technical professions in a local, national, and global context.
- 5.) Demonstrating an individual desire and commitment to pursue continuous self-improvement and lifelong learning.

PROGRAM OUTCOMES

These are statements that describe what students are expected to know and able to do by the time of graduation. Graduates with a BSCM or BSET degree from UNC Charlotte will be able to:

- 1.) Utilize appropriate tools to acquire data and analyze problems. (TAC 3a, 3b, 3c – see below)
- 2.) Demonstrate effective skills in the development and presentation of team projects. (TAC 3e, 3g, 3k)
- 3.) Exhibit knowledge and skills consistent with the expectations of a practicing engineering technologist. (TAC 3h, 3j, 3k)
- 4.) Generate creative and realistic solutions to defined problems and projects. (TAC 3a, 3d, 3f)
- 5.) Recognize the value of diversity, and identify ethical and societal issues in business and technical tasks. (TAC 3i, 3j)
- 6.) Solve problems and design components, systems, or processes appropriate to the discipline. (TAC 3a, 3d, & Program Criteria) *Each program defines the specific details of this outcome.*

The Construction Management and Engineering Technology programs identify, measure, and improve student competencies through assessment and continuous improvement of program outcomes, which are mapped to the TAC of ABET Criterion 3 (a through k) criteria listed below:

TAC of ABET Criterion 3 a through k Skills	
Each program must demonstrate that graduates have:	
a. An ability to select and apply the knowledge, techniques, skills, and modern tools of their disciplines to broadly-defined engineering technology activities.	
b. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering	

	technology problems that require the application of principles and applied procedures or methodologies.
c.	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.
d.	An ability to design systems, components, or processes for broadly defined engineering technology problems appropriate to program educational objectives.
e.	An ability to function effectively as a member or leader on a technical team.
f.	An ability to identify, analyze, and solve broadly-defined engineering technology problems.
g.	An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.
h.	An understanding of the need for and an ability to engage in self-directed continuing professional development.
i.	An understanding of and a commitment to address professional, ethical, and social responsibilities including a respect for diversity.
j.	A knowledge of the impact of engineering technology solutions in a societal and global context.
k.	A commitment to quality, timeliness, and continuous improvement.

BACHELOR OF SCIENCE IN CONSTRUCTION MANAGEMENT (BSCM)

The Bachelor of Science in Construction Management (BSCM) 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, including, but not limited to, real estate and land development, infrastructure development, code enforcement, and insurance, among others.

The program is further enhanced by a business / management core which includes courses in statistics, computer applications, economics, accounting, engineering economics, business management, business law, finance, and construction law.

The Construction Management program shares a common lower division (freshman and sophomore year) curriculum with the Civil Engineering Technology (CIET) Program, providing students with a two-year window for exploration to determine which degree, the BS in Civil Engineering Technology or BS in Construction Management, is their desired academic objective.

REQUIREMENTS FOR ADMISSION

Applicants for this program may enter directly after completing high school, as a lower-division transfer without a completed Associate in Applied Science (AAS), or may enter with 64 credit hours for an AAS 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 AAS degree in a field from among: Architectural, Building Construction, Civil Engineering Technology, Construction Management, Design and Drafting, Surveying Technology, or similar title with curriculum acceptable to the department (It should be noted by potential transfer students that students with an AAS in Civil Engineering Technology are typically best positioned for entry to the program with fewest entrance deficiencies.);
- 2) An overall GPA 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 (BSCM) degree program only. These hours may not be valid toward other degree programs at UNC Charlotte.

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 UNC Charlotte to satisfy residence requirements.

EXPERIENTIAL LEARNING REQUIREMENTS

All students must complete an experiential learning course. Experiential courses are practice-oriented courses such as cooperative education, internships, senior design projects, or undergraduate research.

Internships, or *49erships*, involve paid or unpaid work in a career-related position for professional experience. A minimum of 80 work hours and 5 weeks for one semester is required to complete the program. Fall and Spring 49erships are part-time. Summer 49erships may be full- or part-time. Full-time students who are in good University standing, have completed 30 credit hours, and have a 2.0 minimum cumulative GPA are eligible. Internships do not offer academic credit, but are noted on the student's transcript; students pay a course registration fee. Approval for enrollment must be arranged before the student begins a work experience. Students may begin this program during their sophomore year; transfer students must complete 12 credit hours at UNC Charlotte before making application for the program. For more information, contact the College of Engineering Office of Student Development and Success or the University Career Center.

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 and enrollment in senior level coursework is prohibited until all deficiencies are removed.

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)
- Analytical, Physical, or Environmental Science with Lab (8)
- Macro Economics (3)
- Construction Methods (3)
- Construction Materials (3)
- Statics (3)
- Strength of Materials (3)
- Construction Surveying (3)
- Computer-Aided Drafting (3)
- Environmental Technology, Hydraulics, or Hydrology (3)
- Engineering Technology Computing Applications (3)

Suggested Curriculum:

B.S. in Construction Management (BSCM)

First Year	
Fall Semester	
Course	Credits
ENGL 1101 English Composition	3
ETCE 1121 Construction Methods	3
ETGR 1100 Engineering Computer Apps ^{^^^}	3
ETGR 1103 Technical Drawing I	2
ETGR 1201 Intro to Engineering Technology	2
MATH 1100 College Algebra & Probability*	3
Spring Semester	
Course	Credits
CMET 1680 Professional Development I: Construction Safety	1
ENGL 1102 Writing in the Academic Community [^]	3
ETCE 1211/1211L Surveying I / Lab	3
ETCE 1222/1222L Construction Materials / Lab	3
ETCE 1104 Civil/Construction CAD Applications	2
MATH 1103 Precalculus Math for Science and Engineering*	3

Second Year	
Fall Semester	
Course	Credits
ETCE 2112/2112L Construction Surveying & Layout / Lab	3
ETGR 2101 Applied Mechanics I	3
GEOL 1200, CHEM 1111 or 1251	3
MATH 1121 ET Calculus	3
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
Spring Semester	
Course	Credits
CMET 2680 Professional Development II: Plan Reading & Quantity Takeoff	1
ETCE 2410 Introduction to Environmental Engineering Technology	3
ETGR 2102 Applied Mechanics II	3
PHYS 1102 Introductory Physics II	3
STAT 1220 Elements of Statistics I	3
ECON 2101 Principles of Economics – Macro** ^^^^	3

Third Year	
Fall Semester	
Course	Credits
ACCT 2121 Principles of Accounting I^^^^	3
CMET 3224 Construction Project Administration	3
ETCE 3131 Foundations & Earthwork	3
ETCE 3131L Soil Testing Lab (W)	1
ETCE 3163 Structural Analysis & Design I	3
ETCE 3163L Structures & Materials Lab	1
ETGR 3071 ET Professional Seminar (W)	1
Spring Semester	
Course	Credits
ACCT 2122 Principles of Accounting II^^^^	3
CMET 3123 Cost Estimating	3
CMET 3680 Professional Development III: Temporary Structures	1
ETGR 3222 Engineering Economics^^^^	3
ETCE 3271 Building Systems	3
ETCE 3271L Building Systems Lab (W)	1
LBST 110X Arts & Society**	3

Fourth Year	
Fall Semester	
Course	Credits
BLAW 3150 Business Law I ^{^^^}	3
CMET 4125 Construction Codes, Documents, & Permits	2
CMET 4126 Project Scheduling & Control	3
CMET 4129L Construction Practices Lab (W)	1
ETCE 4251 Highway Design & Construction	3
LBST 2101 Western Culture & History ^{**}	3
Spring Semester	
Course	Credits
CMET 4228 Construction Office Operations	2
CMET 4272 Capstone Project (O, W)	2
CMET 4680 Professional Development IV	1
MGMT 3140 Management & Organizational Behavior ^{^^^}	3
Core Elective (Technical or Construction B&M) ^{^^}	3
LBST 2102 Global Connections ^{**}	3
LBST 221X Ethical & Cultural Critique ^{**}	3

Total Credit Hours = 128

**Course selected based on Math Placement Test.*

*** General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.*

^^^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 2101 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 above.

^^Core Elective may be Technical or Construction B&M. Technical Core Electives must be courses within the Department of Engineering Technology and Construction Management and approved by advisor (ETGR, ETCE, CMET, ETFS, ETEE, ELET, or ETME). Construction B&M Elective must be: MKTG 3110, FINN 3120, CMET 4127, or approved by the construction faculty advisor.

^Writing elective available upon successful completion of ENGL 1103.

BACHELOR OF SCIENCE IN ENGINEERING TECHNOLOGY (BSET)

Disciplines of study in Engineering Technology at UNC Charlotte include:

CIVIL ENGINEERING TECHNOLOGY

Civil Engineering Technology includes computer-aided drafting (CAD); structures (analysis, design of structural steel and reinforced concrete); construction (cost estimating, construction planning and administration); transportation (surveying, highway design and construction); water resources (hydraulics, hydrology, and environmental); and geotechnical (soil mechanics, foundations and earthwork).

ELECTRICAL ENGINEERING TECHNOLOGY

Electrical Engineering Technology includes programming, AC/DC circuits, digital circuits, microprocessors and microcontrollers, solid-state electronics, integrated circuits, analog and digital systems, linear and nonlinear networks, power systems, communications, and control systems.

FIRE SAFETY ENGINEERING TECHNOLOGY

Fire Safety Engineering Technology includes principles of fire behavior and combustion, fire protection, hydraulics, fire prevention, building construction for fire service, industrial hazards, risk management, fire safety problem analysis, active and passive protection systems, command and control, fire protection law, [structural fire safety](#), [performance-based design for fire safety](#), [fire hazard analysis](#), technical drawing and CAD, research investigation and leadership.

MECHANICAL ENGINEERING TECHNOLOGY

Mechanical Engineering Technology includes technical and mechanical drawing, computer-aided design, machine design, manufacturing and machine processes, fluid power systems, statics and strength of materials, mechanisms, stress analysis, instrumentation and controls, thermodynamic systems, heat transfer, dynamics, methods analysis and engineering economics.

ADMISSION REQUIREMENTS

Students for this degree may enter degree programs in the Department of Engineering Technology and Construction Management as freshmen or as transfer students.

Freshman Admission

Applicants entering as freshmen must meet the general University admission requirements.

Transfer Admission

Transfer admission into the Department occurs in one of two situations:

- 1) Transfer applicants not having the Associate in Applied Science (AAS) degree or its equivalent must meet general University admission requirements.
- 2) Transfer applicants with an Associate of Applied Science (AAS) degree must:
 - a) Hold an Associate of Applied Science (AAS) degree in a field appropriate to the option they plan to enter. Acceptable AAS degrees include Architectural, Automation, Building Construction, Civil, Construction, Computer, Controls, Design and Drafting, Electrical, Electronics, Environmental, Fire Protection, Fire Science, Industrial, Instrumentation, Manufacturing, Mechanical, Optics, Robotics, Surveying or similar title with curriculum acceptable to the department. A minimum grade point average of 2.2 (out of 4.0) in the AAS degree is required.
 - b) Have completed satisfactorily the prerequisite background courses for the option they plan to enter (missing background courses may be taken at UNC Charlotte).

Acceptance of a completed AAS degree indicates the acceptance of up to 64 semester credit hours toward the Bachelor of Science in Engineering Technology degree program only. These hours may not be valid toward other degree programs at UNC Charlotte.

RESIDENCE REQUIREMENTS

A student must earn the last 30 semester hours of credit toward the BSET degree and the last 12 semester hours of work in the major at UNC Charlotte to satisfy residence requirements.

EXPERIENTIAL LEARNING REQUIREMENTS

All students must complete an experiential learning course. Experiential courses are practice-oriented courses such as cooperative education, internships, senior design projects, or undergraduate research.

Internships, or *49erships*, involve paid or unpaid work in a career-related position for professional experience. A minimum of 80 work hours and 5 weeks for one semester is required to complete the program. Fall and Spring 49erships are part-time. Summer 49erships may be full- or part-time. Full-time students who are in good University standing, have completed 30 credit hours, and have a 2.0 minimum cumulative GPA are eligible. Internships do not offer academic credit, but are noted on the student's transcript; students pay a course registration fee. Approval for enrollment must be arranged before the student begins a work experience. Students may begin this program during their sophomore year; transfer students must complete 12 credit hours at UNC Charlotte before making application for the program. For more information, contact the College of Engineering Office of Student Development and Success or the University Career Center.

REMEDICATION OF ACADEMIC ENTRANCE REQUIREMENTS FOR AAS TRANSFER STUDENTS

In addition to University and College of Engineering requirements, an AAS transfer student who is admitted to any BSET program without meeting ALL published admission requirements is expected to remove all admission deficiencies within one year. Violators are subject to discontinuance and enrollment in senior level coursework is prohibited until all deficiencies are removed.

COURSE REQUIREMENTS

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

- 1) Entering Freshmen: Students admitted as freshmen will complete the appropriate four year curriculum for the program into which they were admitted.
- 2) Transfer students not holding an appropriate AAS degree: Transfer students not holding an appropriate AAS degree must complete the remaining coursework outlined for the respective four year curriculum that they were admitted into after evaluation and application of any transfer credit.
- 3) Transfer students holding an AAS degree: Transfer students with an acceptable Associate of Applied Science (AAS) degree as defined previously under admission requirements may begin the program in the junior year with up to 64 transfer credit hours awarded. Prerequisites for students holding an AAS degree from a community or technical college are listed below.

PREREQUISITES FOR ADMISSION TO THE CIVIL, ELECTRICAL, FIRE SAFETY (FIRE PROTECTION CONCENTRATION), AND MECHANICAL ENGINEERING TECHNOLOGY PROGRAMS

Students transferring with an AAS degree must have satisfactorily completed the following subjects in their two-year program:

- English Composition, Technical Writing and/or Public Speaking (*6 semester hours*)
- Algebra and Trigonometry (*6 semester hours*)
- Differential and Integral Calculus (*3 semester hours*)
- General Physics (with lab) (*4 semester hours*)
- Additional Physics or Chemistry (with lab) or Geology (*for CIET*) (*4 semester hours*)
- Humanities or Social Sciences (*3 semester hours*)
- Technical Courses in Major Area as listed under Discipline Specific Prerequisites below (*up to 38 semester hours*)

Total maximum transfer credit from two-year colleges is 64 semester hours.

DISCIPLINE SPECIFIC PREREQUISITES

Civil

- ET Computer Applications
- Computer Aided Drafting
- Construction Surveying
- Statics

- Strength of Materials
- Construction Materials
- Construction Methods
- Hydraulics or fluid mechanics or environmental technology

Electrical

- DC Circuits and DC Circuits Laboratory
- AC Circuits and AC Circuits Laboratory
- Circuit Simulation
- Digital Circuits and Digital Circuits Laboratory
- Electronic Devices and Electronic Devices Laboratory
- Power Systems and Machines
- Microprocessors
- Instrumentation or Programmable Logic Controllers and associated laboratory
- C Programming

Fire Protection Concentration

- Drafting/Computer Aided Drafting
- Statics
- Introduction to Fire Protection
- Fire Prevention and Public Education
- Fire Detection and Fire Investigation
- Building Construction
- Inspections and Codes
- Sprinklers and Automatic Alarms
- Fire Fighting Strategies
- Hydraulics and Water Distribution
- Managing Fire Services

Mechanical

- Drafting/Computer Aided Drafting
- Machine Processes
- Statics
- Metallurgy or Engineering Materials
- Kinematics or Mechanisms
- Basic Electrical Circuits (in addition to Physics II)
- Computer Programming (using a higher level language such as Visual Basic, FORTRAN, or C++)

PREREQUISITES FOR ADMISSION TO THE FIRE SAFETY (FIRE SAFETY CONCENTRATION) ENGINEERING TECHNOLOGY PROGRAM

Students transferring with an AAS degree must have satisfactorily completed the following subjects in their two-year associate degree program:

- English Composition, Technical Writing and/or Public Speaking (6-9 semester hours)
- Algebra (3 semester hours)
- Two science courses with Laboratory (8 semester hours)
- Humanities and/or Social Sciences (6-9 semester hours)
- Computer Literacy Course
- Technical Courses in Major Area as listed below (32-38 semester hours)
 - Introduction to Fire Protection
 - Fire Prevention and Public Education
 - Fire Detection and Fire Investigation

- Building Construction
- Inspections and Codes
- Sprinklers and Automatic Alarms
- Fire Protection Law
- Fire Fighting Strategies
- Chemistry of Hazardous Materials
- Hydraulics and Water Distribution
- Managing Fire Services

CURRICULUM OUTLINE: CIVIL ENGINEERING TECHNOLOGY PROGRAM

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.

AAS transfer students from approved programs will receive 64 credit hours for the AAS degree; thus, AAS 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 AAS transfer students.

**Suggested Curriculum:
Civil Engineering Technology Program**

First Year	
Fall Semester	
Course	Credits
ENGL 1101 English Composition	3
ETCE 1121 Construction Methods	3
ETGR 1100 Engineering Computer Apps	3
ETGR 1103 Technical Drawing I	2
ETGR 1201 Intro to Engineering Technology	2
MATH 1100 College Algebra & Probability*	3
Spring Semester	
Course	Credits
CMET 1680 Professional Development I: Construction Safety	1
ENGL 1102 Writing in the Academic Community^	3
ETCE 1211/1211L Surveying I / Lab	3
ETCE 1222/1222L Construction Materials / Lab	3
ETCE 1104 Civil/Construction CAD Applications	2
MATH 1103 Precalculus Math for Science and Engineering*	3

Second Year	
Fall Semester	
Course	Credits
ETCE 2112/2112L Construction Surveying & Layout / Lab	3
ETGR 2101 Applied Mechanics I	3
GEOL 1200, CHEM 1111 or 1251	3
MATH 1121 ET Calculus*	3
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
Spring Semester	
Course	Credits
ETCE 2410 Introduction to Environmental Engineering Technology	3
CMET 2680 Professional Development II: Plan Reading & Quantity Takeoff	1
ETGR 2102 Applied Mechanics II	3
PHYS 1102 Introductory Physics II	3
PHYS 1102L Introductory Physics II Lab	1
STAT 1220 Elements of Statistics I	3
Social Science Elective** ANTH 1101; GEOG 1105; POLS 1110; ECON 1101 or 2101; or SOCY 1101	3

Third Year	
Fall Semester	
Course	Credits
CMET 3224 Construction Project Administration	3
ETCE 3131 Foundations & Earthwork	3
ETCE 3131L Soil Testing Lab (W)	1
ETCE 3163 Structural Analysis & Design I	3
ETCE 3163L Structures & Materials Lab	1
ETGR 3071 ET Professional Seminar (W)	1
LBST 110X Arts & Society**	3
Spring Semester	
Course	Credits
CMET 3680 Professional Development III: Temporary Structures	1
ETCE 3242 Hydraulics & Hydrology	3
ETCE 3242L Hydraulics Lab (W)	1
ETCE 3264 Structural Analysis II	3
ETGR 3171 Engineering Analysis I	3
ETGR 3222 Engineering Economics	3
LBST 2101 Western History & Culture**	3

Fourth Year	
Fall Semester	
Course	Credits
CHEM 1111, 1251, or GEOL 1200****	3
CHEM 1111L, 1251L, or GEOL 1200L****	1
ETCE 4251 Highway Design & Construction	3
ETCE 4165 Structural Steel Design	3
LBST 2102 Global Connections**	3
Major Elective***	3
Major Elective Lab (W)***	1
Spring Semester	
Course	Credits
ETCE 4143 Water & Wastewater Systems	1
ETCE 4266 Reinforced Concrete Design	3
ETCE 4272 Capstone Project (O, W)	2
CMET 4680 Professional Development IV	1
LBST 221X Ethical & Cultural Critique**	3
Major Elective***	3

Total Credit Hours = 128

[^]Writing elective available upon successful completion of ENGL 1103.

*Course selected based on Math Placement Test.

**General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.

***Major elective courses are approved by the Department as major electives for the respective program. A list is maintained in and published by the Department.

****Transfer students with an AAS may have completed differing science courses at the community college. Generally, AAS transfer students entering the Civil ET program will take Chemistry in the junior year at UNC Charlotte; however, the following chart will provide additional guidance for fulfilling the science requirement at UNC Charlotte:

Transfer Students with an AAS Degree who have previously taken:	Shall Take at UNC Charlotte:
2 semesters of physics and no chemistry	CHEM 1251 with lab
1 semester of physics and 1 semester of chemistry	PHYS 1102 with lab
2 semesters of physics and 1 semester of chemistry	GEOL 1200 with lab

**Suggested Curriculum:
Electrical Engineering Technology Program**

First Year	
Fall Semester	
Course	Credits
ENGL 1101 English Composition	3
MATH 1100 College Algebra & Probability*	3
ELET 1101 Simulation & Schematic Capture	1
ELET 1111 DC Circuits	3
ELET 1111L DC Circuits Lab	1
ETGR 1100 Engineering Computer Apps	3
ETGR 1201 Intro to Engineering Technology	2
Spring Semester	
Course	Credits
ENGL 1102 Writing in the Academic Community	3
MATH 1103 Precalculus Math for Science and Engineering*	3
ELET 1231 Digital Circuits	3
ELET 1231L Digital Circuits Lab	1
ELET 1212 AC Circuits	3
ELET 1212L AC Circuits Lab	1
Social Science Elective**	3
Second Year	
Fall Semester	
Course	Credits
STAT 1220 Elements of Statistics I	3
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
ELET 2121 Electronics I	3
ELET 2121L Electronics I Lab	1
ELET 2141 Introduction to Power Systems	3
Spring Semester	
Course	Credits
MATH 1121 ET Calculus	3
PHYS 1102 Introductory Physics II	3
PHYS 1102L Introductory Physics II Lab	1
ELET 2231 Microprocessor Fundamentals	3
ELET 2201 C Programming	3
ELET 2241 Instrumentation	3
ELET 2241L Instrumentation Lab	1

Third Year	
Fall Semester	
Course	Credits
CHEM 1251 Principles of Chemistry****	3
ELET 3132 Digital Systems	3
ELET 3132L Digital Systems Lab (W)	1
ELET 3113 Network Analysis	3
ETGR 3071 ET Professional Seminar (W)	1
ETGR 3171 Engineering Analysis	3
LBST 110X Arts & Society**	3
Spring Semester	
Course	Credits
ELET 3222 Electronics II	3
ELET 3222L Electronics II Lab (W)	1
ETGR 3222 Engineering Economics	3
ELET 3232 Microcontroller Systems	3
ETGR 2122 Technical Programming	3
LBST 2101 Western Culture & History**	3

Fourth Year	
Fall Semester	
Course	Credits
ELET 4142 Power Electronics / Networks	3
ELET 4151 Communication Systems	3
ELET 4151L Communication Systems Lab (W)	1
ELET 4191 Applied Project Management	2
ELET 4192 Senior Project I (W)	2
Major Elective***	3
LBST 2102 Global Connections	3
Spring Semester	
Course	Credits
ELET 4223 Active Filters	3
ELET 4242 Control Systems	3
ELET 4293 Senior Project II	2
Major Elective***	3
LBST 221X Ethical & Cultural Critique**	3

Total Credit Hours = 128

* Course selected based on Math Placement Test.

**General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.

***Major elective courses are approved by the Department as major electives for the respective program. A list is maintained in and published by the Department.

****Transfer students with an AAS may have completed differing science courses at the community college. Generally, AAS transfer students entering the Electrical ET programs will take Chemistry in the junior year at UNC Charlotte; however, the following chart will provide additional guidance for fulfilling the science requirement at UNC Charlotte:

Transfer Students with an AAS Degree who have previously taken:	Shall Take at UNC Charlotte:
2 semesters of physics and no chemistry	CHEM 1251
1 semester of physics and 1 semester of chemistry	PHYS 1102 with lab
2 semesters of physics and 1 semester of chemistry	GEOL 1200, BIOL 1110, PHYS 1130, or CHEM 1252

Suggested Curriculum:
Fire Safety Engineering Technology Program
Fire Protection Concentration

First Year

Fall Semester

<u>Course</u>	<u>Credits</u>
<u>ENGL 1101 English Composition</u>	<u>3</u>
<u>ETFS 1120 Fundamentals of Fire Protection</u>	<u>3</u>
<u>ETGR 1100 Engineering Technology Computer Applications</u>	<u>3</u>
<u>ETGR 1103 Technical Drawing I</u>	<u>2</u>
<u>ETGR 1201 Introduction to Engineering Technology</u>	<u>2</u>
<u>MATH 1103 Pre-calculus Math for Science and Engineering</u>	<u>3</u>

Spring Semester

<u>Course</u>	<u>Credits</u>
<u>ENGL 1102 Writing in the Academic Community</u>	<u>3</u>
<u>ETFS 1232 Fire Protection Hydraulics & Water Supply</u>	<u>3</u>
<u>ETFS 2144 Fire Protection Systems</u>	<u>3</u>
<u>LBST 110X Arts & Society**</u>	<u>3</u>
<u>STAT 1220 Elements of Statistics I</u>	<u>3</u>

Second Year	
Fall Semester	
Course	Credits
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
ETFS 2124 Fundamentals of Fire Prevention	3
ETFS 2132 Building Construction for Fire Protection	3
ETGR 2101 Applied Mechanics I	3
ETGR 2171 Engineering Analysis I or MATH 1121 Calculus (ET)	3
Spring Semester	
Course	Credits
PHYS 1102 Introductory Physics II	3
PHYS 1102L Introductory Physics II Lab	1
ETFS 2126 Fire Investigation	3
ETFS 2264 Fire Behavior & Combustion	3
ETFS 2264L Fire Behavior & Combustion Lab (W)	1
LBST 2101 Western Culture & Society**	3
Social Science Elective	3
Third Year	
Fall Semester	
Course	Credits
CHEM 1251 Principles of Chemistry I	3
ETFS 3113 Building Fire Safety (W)	3
ETGR 3071 ET Professional Seminar (W.O)	1
ETGR 2272 Engineering Analysis II	3
ETME 3123 Strength of Materials or ETGR 2102 Applied Mechanics II	3
ETME 3133 Fluid Mechanics	3
Spring Semester	
Course	Credits
ETFS 3103 Principles of Fire Behavior	3
ETFS 3103L Principles of Fire Behavior Laboratory (W)	1
ETFS 3123 Industrial Hazards & Electricity	3
ETGR 2106 Electrical Circuits	3
ETGR 3171 Eng. Analysis III or ETGR 4272 Eng. Analysis IV	3
ETME 3143 Thermodynamics	3

Fourth Year	
Fall Semester	
Course	Credits
<u>ETFS 3144 Active Fire Protection</u>	<u>3</u>
<u>ETFS 3242L Fire Testing and Measurement Laboratory (W)</u>	<u>1</u>
<u>ETFS3344 Introduction to Structural Fire Safety</u>	<u>3</u>
<u>ETFS3344L Introduction to Structural Fire Safety Laboratory (W)</u>	<u>1</u>
<u>ETME 3244 Applied Heat Transfer</u>	<u>3</u>
<u>LBST 2102 Global Connections**</u>	<u>3</u>
Spring Semester	
Course	Credits
<u>ETFS 3233 Intro to Performance-based Fire Safety</u>	<u>3</u>
<u>ETFS 3283 Fire Hazard Analysis</u>	<u>3</u>
<u>ETGR 3222 Engineering Economics</u>	<u>3</u>
<u>LBST 221X Ethical Issues & Cultural Critique**</u>	<u>3</u>
<u>Major Elective^^^</u>	<u>3</u>

Total Credit Hours = 125

***General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.*

^^ Major Electives to be selected from approved major elective list.

Suggested Curriculum:
Fire Safety Engineering Technology Program
Fire Safety Concentration

First Year

Fall Semester

Course	Credits
ENGL 1101 English Composition	3
ETFS 1120 Fundamentals of Fire Protection	3
ETFS 1252 Fire Protection Law	3
ETGR 1100 Engineering Technology Computer Applications	3
ETGR 1201 Introduction to Engineering Technology	2
MATH 1100 College Algebra and Probability	3

Spring Semester

Course	Credits
ENGL 1102 Writing in the Academic Community	3
ETFS 1232 Fire Protection Hydraulics & Water Supply	3
ETFS 2144 Fire Protection Systems	3
LBST 110X Arts & Society**	3
STAT 1220 Elements of Statistics I	3

Second Year

Fall Semester

Course	Credits
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
ETFS 2124 Fundamentals of Fire Prevention	3
ETFS 2230 Hazardous Materials	3
ETFS 2132 Building Construction for Fire Protection	3
Social Science Elective (POLS 1110)	3

Spring Semester

Course	Credits
PHYS 1102 Introductory Physics II	3
PHYS 1102L Introductory Physics II Lab	1
ETFS 2126 Fire Investigation	3
ETFS 2264 Fire Behavior & Combustion	3
ETFS 2264L Fire Behavior & Combustion Lab (W)	1
ETGR 1103 Technical Drawing I	2
LBST 2101 Western Culture & Society**	3

Third/Fourth Year - Odd Years	
Fall Semester	
Course	Credits
ETFS 3113 Building Fire Safety (W)	3
ETFS 3124 Risk Management for Emergency Service	3
ETGR 3071 ET Professional Seminar (W,O)	1
ETGR 3222 Engineering Economics	3
CHEM 1251 Principles of Chemistry I	3
PSYC 2171 Introduction to Industrial / Organizational Psychology	3
Spring Semester	
Course	Credits
ETFS 3103 Principles of Fire Behavior	3
ETFS 4123 Community Threat Assessment & Mitigation	3
LBST 2102 Global Connections**	3
POLS 3119 State & Local Gov't	3
Major Elective^^^	3

Third/Fourth Year - Even Years	
Fall Semester	
Course	Credits
ETFS 3144 Active Fire Protection	3
ETFS 4323 Advanced Fire Service Administration	3
LBST 221X Ethical Issues & Cultural Critique**	3
PSYC 3174 Organizational Psychology	3
Major Elective^^^	3
Spring Semester	
Course	Credits
ETFS 3123 Industrial Hazards & Electricity	3
ETFS 3233 Intro to Performance-based Fire Safety	3
ETFS 4243 Research Methodology (W,O)	3
POLS 3126 Administrative Behavior	3
Major Elective^^^	3

Total Credit Hours = 125

***General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.*

^^^Major Electives to be selected from approved major elective list.

**Suggested Curriculum:
Mechanical Engineering Technology Program**

First Year	
Fall Semester	
Course	Credits
ENGL 1101 English Composition	3
MATH 1100 College Algebra & Probability*	3
PHYS 1101 Introductory Physics I	3
PHYS 1101L Introductory Physics I Lab	1
ETGR 1100 Engineering Technology Computer Application	3
ETGR 1103 Technical Drawing I	2
ETGR 1201 Introduction to Engineering Technology	2
Spring Semester	
Course	Credits
ENGL 1102 Writing in the Academic Community	3
MATH 1103 Precalculus Math for Science and Engineering*	3
PHYS 1102 Introductory Physics II	3
PHYS 1102L Introductory Physics II Lab	1
ETGR 1104 Technical Drawing II	2
ETME 1101 Manufacturing Processes	3

Second Year	
Fall Semester	
Course	Credits
MATH 1121 Calculus for Engineering Technology*	3
ETGR 2101 Applied Mechanics I	3
ETME 2156 Machine Shop Practices	2
ETME 2156L Machine Shop Practices Lab	1
ETME 2101 Applied Materials	3
ETME 2202 Introduction to Mechanical Design	2
Social Science General Education Elective**	3
Spring Semester	
Course	Credits
STAT 1220 Elements of Statistics I	3
ETGR 2106 AC & DC Circuits	3
ETME 2102 Mechanisms	3
ETGR 2122 Technical Programming	3
LBST 2101 Western Culture & History**	3

Third Year	
Fall Semester	
Course	Credits
ETGR 3071 ET Professional Seminar	1
ETGR 3171 Engineering Analysis I	3
ETME 3123 Strength of Materials	3
ETME 3133 Fluid Mechanics	3
ETME 3152 Stress Analysis Lab	1
LBST 110X Arts & Society**	3
Spring Semester	
Course	Credits
CHEM 1251 Principles of Chemistry****	3
ETGR 3222 Engineering Economics	3
ETME 3113 Dynamics	3
ETME 3143 Thermodynamics	3
ETME 3151 Fluid Mechanics Lab	1
LBST 2102 Global & Intercultural Connections**	3
Fourth Year	
Fall Semester	
Course	Credits
ETGR 3272 Applied Numerical Methods	3
ETME 3213 Machine Design I	3
ETME 3232 Senior Design Project I	2
ETME 3252 Thermo Lab	1
ETME 3244 Applied Heat Transfer	3
Major Elective***	3
Spring Semester	
Course	Credits
ETME 3242 Senior Design Project II	2
ETME 3251 Instrumentation Lab	1
ETME 3163 Instrumentation & Controls	3
Major Elective***	3
Major Elective***	3
LBST 221X Ethical Issues & Cultural Critique	3

Total Credit Hours = 124

* Course selected based on Math Placement Test.

**General education courses are chosen jointly by student and advisor to ensure that all graduation requirements are met. Non-AAS degreed students must satisfy University and Department General Education requirements. AAS degreed students must satisfy Department General Education requirements.

***Major elective courses are approved by the Department as major electives for the respective program. A list is maintained in and published by the Department.

****Transfer students with an AAS may have completed differing science courses at the community college. Generally, AAS transfer students entering the Mechanical or Electrical ET programs will take Chemistry in the junior year at UNC Charlotte; however, the following chart will provide additional guidance for fulfilling the science requirement at UNC Charlotte:

Mechanical & Electrical ET Transfer Students with an AAS Degree who have previously taken:	Shall Take at UNC Charlotte:
2 semesters of physics and no chemistry	CHEM 1251
1 semester of physics and 1 semester of chemistry	PHYS 1102 with lab
2 semesters of physics and 1 semester of chemistry	GEOL 1200, BIOL 1110, PHYS 1130, or CHEM 1252

SHORT SIGNATURE SHEET



UNC CHARLOTTE

Date: 1/12/12

Subject: Proposal to revise ETFS course names and descriptions

Originating Department: Engineering Technology

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

DATE RECEIVED	DATE FORWARDED	COMMENTS: APPROVED, APPROVED WITH REVISIONS, ETC.	SIGNATURES
			PERSON ORIGINATING PROPOSAL [Jeff Kimble]
		Approved	DEPARTMENT CHAIR [Anthony Brizendine]
		Approved	COLLEGE CURRICULUM COMMITTEE CHAIR [print name here]
		Approved	COLLEGE DEAN [print name here]
		Approved	GENERAL EDUCATION (for General Education courses) [print name here]
		Approved	UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR (for undergraduate courses)
		Approved	GRADUATE COUNCIL CHAIR (for graduate courses)
		Approved	FACULTY GOVERNANCE ASSISTANT (Faculty Council approval on Consent Calendar)



SHORT FORM

COURSE AND CURRICULUM PROPOSAL

*To: Undergraduate Course and Curriculum Committee Chair

From: Jeff Kimble, Program Cord. FSET, Anthony Brizendine, ET Dept Chair

Date: 1/12/12

Re: Changes to numbers, title and course descriptions for ETFS courses

Summary: The Fire Safety Engineering Technology program within the Engineering Technology department proposes the following changes:

1. **Change in the title and course description of ETFS3233 from Applied Fire Engineering Design and Analysis to *Introduction to Performance-Based Fire Safety***

This title change and course description update is necessary to reflect more contemporary philosophies and strategies in building design and fire safety performance features that are based on alternate strategies rather than prescriptive codes.

~~**ETFS 3233. Applied Fire Engineering Design and Analysis. (3). Prerequisite: ETFS 3103. Application of fire safety engineering technology in fire design and analysis of fires. Topics include computer modeling of compartment fires and emergency evacuation of buildings, structural fire design, sprinkler system design, performance-based design, and fire investigation and reconstruction.**~~

ETFS 3233. Introduction to Performance-Based Fire Safety (3). Prerequisites: ETFS 3103. This course provides an overview of the relevant performance-based fire protection engineering tools and skills, and presents the basic concepts and a systematic approach for performance-based fire safety design. The tools can also be used in the investigation and reconstruction of fire incidents. (Spring) (Alternate years)

2. Change in the title and course description of ETFS 4123 from Command and Control of Major Disasters to *Community Threat Assessment and Mitigation*

This title change and course description update is necessary to reflect more contemporary philosophies and strategies in response to large scale incidents in the emergency service arena. It also reflects the changes in the course to include students who may take this course who are from outside the fire service profession.

~~**ETFS 4123. Command and Control of Major Disasters. (3) This course focuses on the commanding officer's responsibility while conducting major operations involving multi-alarm units and man-made disasters that may require interagency or jurisdictional coordination. Earthquakes, hurricanes, terrorism, hazardous materials releases, tornadoes, and floods are some of the topics covered. Emphasis is placed on rapid fireground decision making, advanced incident command, command and control, safety, personnel accountability, hazard preparedness, mitigation, response, recovery, evacuation, sheltering and communications.**~~

ETFS 4123. Community Threat Assessment and Mitigation. (3) This course focuses on the emergency service's responsibility while conducting major operations involving multi-alarm incidents, natural and man-made disasters that may require interagency or jurisdictional coordination. Emphasis is on threat assessment and mitigation strategies of potential large scale disasters including but not limited to earthquakes, hurricanes, terrorism, hazardous materials releases, tornadoes, and floods. Topics include fireground decision making, advanced incident command, command and control, safety, personnel accountability, hazard preparedness, mitigation, response, recovery, evacuation, sheltering and communications.

3. Change in the title of ETFS 4243 from Research Investigation to *ETFS 4243 Research Methodology*

This title change more accurately reflects the intent of the course.

*Proposals for undergraduate courses should be sent to the Undergraduate Course and Curriculum Committee Chair. Proposals related to both undergraduate and graduate courses, (e.g., courses co-listed at both levels) must be sent to both the Undergraduate Course and Curriculum Committee and the Graduate Council.

SUMMARY: State clearly and concisely the proposed changes. Please give a brief statement as to why the change is being proposed.

The Department of Technology proposes a change in the course description for ETFS 3233 & 4123 to more accurately reflect the contemporary subject covered in these courses.

Additionally the ET Department proposes changes in the titles of ETFS 3233, 4123, & 4243 to more accurately reflect the updated course content for each course respectively.

FOR CONSULTATION WITH OTHER DEPARTMENTS:

1. Does the proposed change affect other departments?
_____ Yes _____ No

2. If Yes, please list the other departments affected by the proposed change:

3. Have you consulted with each department listed in item 2 regarding the proposed change?
_____ Yes _____ No

Result(s) of Consultation(s) (please attach documentation):

For a new course or for major modification of an existing course, include [Consultation on Library Holdings](#).

RESOURCES:

1. 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 co-requisites for this course.
_____ This course is repeatable for credit.
_____ This course will affect the number of credits hours for 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.

2. Indicate the additional resources required, if any, to implement and maintain the proposed change.

PROPOSED CATALOG COPY: For existing courses copy and paste the [current catalog copy](#) and use the Microsoft Word “track changes” feature (or use “~~striketrough~~” formatting in red text for text to be deleted, and adding and highlighting any **new text in blue font**). For new courses, draft comprehensive catalog copy.

ACADEMIC PLAN OF STUDY: If the proposed change will impact an existing Academic Plan of Study, provide updated [Academic Plan of Study](#) in template format.

IMPORTANT NOTE: A Microsoft Word version of the final course and curriculum proposal should be sent to facultygovernance@uncc.edu upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.