

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

NEW UNDERGRADUATE CURRICULUM PROPOSAL

COURSE AND CURRICULUM PROPOSAL FROM: ENGINEERING TECHNOLOGY

Establishment of a New Undergraduate Track in Fire Safety Engineering Technology**A. PROPOSAL SUMMARY AND CATALOG COPY.****A.1 Proposal Summary**

The Department of Engineering Technology proposes the creation of a Fire Protection track within the Fire Safety Engineering Technology (FSET) undergraduate program. The new track will be named Fire Protection Engineering Technology (FPET). With the addition of this new track, students can choose between two tracks: Fire Safety Engineering Technology or Fire Protection Engineering Technology. The emphasis of the existing FSET track will remain 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 FPET track 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 new FPET track comprises a total of 125 credit hours. A summary of all FPET courses is shown in the table on Page 3. The following five new courses (9 credits, highlighted with light green background color in the table) will be created and developed for the new FPET track:

ETFS3103L Principles of Fire Behavior Laboratory	1 credit
ETFS 3242L Fire Testing and Measurement Laboratory	1 credits
ETFS 3283 Fire Hazard Analysis	3 credits
ETFS4344 Structural Fire Safety	3 credits
ETFS4344L Structural Fire Safety Laboratory	1 credit

The title for ETFS3233 will be changed for both the FSET and FPET tracks:

ETFS4233 Performance-Based Fire Safety	3 credits
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Nine courses (27 credits, titles in *Italic* in the table) will be used to replace nine existing FSET track courses and to enhance the math and engineering requirements for the new FPET track:

MATH1103 Pre-calculus Math for Science and Engineering	3 credits
MATH1121 Calculus (ET)	3 credits
ETGR2101 Applied Mechanics I	3 credits
ETGR2106 Electrical Circuits	3 credits
ETGR3171 Engineering Analysis I	3 credits
ETME3123 Strength of Materials (or ETGR2102 Applied Mechanics II)	3 credits
ETME3133 Fluid Mechanics	3 credits
ETMS3143 Thermodynamics	3 credits
ETME3244 Applied Heat Transfer	3 credits

The existing FSET curriculum will also be revised. The revised FSET curriculum is shown on Page 4. The following changes were made:

- 1) A “Directed Elective for Writing Intensive Goal” course in the spring semester of sophomore year was deleted from the FSET curriculum and was replaced by ETFS2144 Fire Protection Systems in the spring semester of freshman year; (Note: ETFS2144 was in the FSET curriculum.)
- 2) ETFS 2230 Hazardous Materials in the spring semester of sophomore year was moved to the fall semester of sophomore year;
- 3) ETFS1252 was moved to the first semester of freshman year;
- 4) CHEM 1111 was changed to CHEM 1251 and moved to the first semester of junior year;
- 5) The course title for ETFS4123 was changed to Community Threat Assessment and Mitigation and the course description was also changed;
- 6) The course title for ETFS3233 was changed to ETFS4233 Performance-Based Fire Safety and the course description was also changed;
- 7) The course title for ETFS4243 was changed to Research Methodology;
- 8) ETFS3183 in the spring semester of senior year was deleted from the FSET curriculum and was replaced by a Major Elective course;
- 9) Directed Elective courses (HBSS) were replaced by Major Elective courses;
- 10) ETFS3611 in the spring semester of junior year was replaced by ETGR3071 (or ETFS3611);
- 11) ETFS3113 was designated as a writing intensive (W) course;
- 12) “Directed Elective” courses were replaced by “Major Elective” courses, and the description of “Major Elective” was added as “To be selected from approved major elective course list.”

FIRE PROTECTION ENGINEERING TECHNOLOGY CURRICULUM

Freshman YearTotal Credit Hours: 125**Fall**

Course Name	Prefix & #	Hrs
English Composition	ENGL 1101	3
College Algebra and Probability	MATH 1100	3
Introduction to ET	ETGR 1201	2
Fundamentals of Fire Prot.*	ETFS 1120	3
Engineering Tech Computer Applic.	ETGR 1100	3
Technical Drawing I	ETGR 1103	2
Total Hours		16

Spring

Course Name	Prefix & #	Hrs
Writing in the Acad. Comm.	ENGL 1102	3
Fire Protection Systems	ETFS 2144	3
Fire Prot. Hydraulics & Water Supply*	ETFS 1232	3
<i>Precalculus Math for Science & Eng</i>	MATH 1103	3
LBST Course ₄	LBST 110X	3
Total Hours		15

Sophomore Year**Fall**

Course Name	Prefix & #	Hrs
Introductory Physics I	PHYS 1101	3
Introductory Physics I Lab	PHYS 1101L	1
Fundamentals of Fire Prevention*	ETFS 2124	3
Building Construction for Fire Prot.*	ETFS 2132	3
LBST Course ₄	LBST 2101	3
<i>Applied Mechanics I</i>	ETGR 2101	3
Total Hours		16

Spring

Course Name	Prefix & #	Hrs
Science 2 ₃ (PHYS 1102)	PHYS 1102	3
Science 2 ₃ Lab (PHYS 1102L)	PHYS1102L	1
Fire Investigation	ETFS 2126	3
Fire Behavior & Combustion*	ETFS 2264	3
Fire Behavior & Combustion Lab* (W)	ETFS 2264L	1
Elements of Statistics I	STAT 1220	3
Social Science Course ₁		3
Total Hours		17

Junior Year**Fall**

Course Name	Prefix & #	Hrs
<i>Calculus (ET)</i>	MATH 1121	3
Principles of Chemistry I	CHEM 1251	3
Building Fire Safety (W)	ETFS 3113	3
ET Prof. Seminar (W, O)	ETGR3071	1
<i>Fluid Mechanics</i>	ETME 3133	3
<i>Strength of Materials(or Applied Mech. II)</i>	ETME 3123	3
Total Hours		16

Spring

Course Name	Prefix & #	Hrs
<i>Electrical Circuits</i>	ETGR 2106	3
Industrial Hazards	ETFS 3123	3
<i>Thermodynamics</i>	ETME 3143	3
Principles of Fire Behavior	ETFS 3103	3
Principles of Fire Behavior Lab (W)	ETFS 3103L	1
<i>Engineering Analysis I</i>	ETGR3171	3
Total Hours		16

Senior Year**Fall**

Course Name	Prefix & #	Hrs
<i>Applied Heat Transfer</i>	ETME3244	3
Fire Testing and Measurement Lab (W)	ETFS 4242L	1
Active Fire Protection	ETFS 3144	3
Structural Fire Safety	ETFS 4344	3
Structural Fire Safety Lab (W)	ETFS4344L	1
LBST Course ₄	LBST 2102	3
Total Hours		14

Spring

Course Name	Prefix & #	Hrs
Performance-Based Fire Safety	ETFS 4233	3
Major Elective ₅		3
Fire Hazard Analysis	ETFS 3283	3
LBST Course ₄	LBST 221X	3
Engineering Economics	ETGR3222	3
Total Hours		15

Notes :

1. Social Science Course -Take ANTH 1101, GEOG 1105, ECON 1101, 2101, POLS 1110, or SOCY 1101
2. Directed Electives- are chosen jointly by the student and advisor (W Goal-ENGL 2116, PHIL 2102 or another Writing Intensive)
3. Science 2 - PYHS 1102 & Lab (or another Life or Physical Science course -must be approved by advisor)
- 4.LBST Courses- LBST 110X, 2101, 2102 and 221X
5. Major Electives -to be selected from approved major elective course list

(BSET) FIRE SAFETY ENGINEERING TECHNOLOGY CURRICULUM
FOUR YEAR CURRICULUM

	800 -	
Last Name	First Name	Catalog Term

Freshman Year

Fall- Even Years

Course Name	Prefix & #	Grade	Hrs
Fire Protection Law	ETFS 1252		3
English Composition	ENGL 1101		3
Fundamentals of Fire Prot.*	ETFS 1120		3
Engineering Tech Computer Applic.	ETGR 1100		3
Introduction to ET	ETGR 1201		2
College Algebra and Probability	MATH 1100		3
Total Hours			17

Spring -Odd Years

Course Name	Prefix & #	Grade	Hrs
Writing in the Acad. Comm.	ENGL 1102		3
Fire Prot. Hydraulics & Water Supply*	ETFS 1232		3
Arts and Society ₃	LBST 110X ₃		3
Elements of Statistics I	STAT 1220		3
Fire Protection Systems	ETFS 2144		3
Total Hours			15

Sophomore Year

Fall- Odd Years

Course Name	Prefix & #	Grade	Hrs
Fundamentals of Fire Prevention*	ETFS 2124		3
Building Construction for Fire Prot.*	ETFS 2132		3
Introductory Physics I	PHYS 1101		3
Introductory Physics I Lab	PHYS 1101L		1
Social Science Elective ₁	POLS 1110 ₁		3
Hazardous Materials	ETFS 2230		3
Total Hours			16

Spring - Even Years

Course Name	Prefix & #	Grade	Hrs
Fire Investigation	ETFS 2126		3
Western Culture and Hist. Awareness	LBST 2101		3
Fire Behavior & Combustion*	ETFS 2264		3
Fire Behavior & Combustion Lab* (W)	ETFS 2264L		1
Technical Drawing I	ETGR 1103		2
Introductory Physics II	PHYS 1102		3
Introductory Physics II Lab	PHYS 1102L		1
Total Hours			16

Junior Year

Fall- Odd Years

Course Name	Prefix & #	Grade	Hrs
Building Fire Safety (W)	ETFS 3113		3
Risk Management for Emrg. Serv.	ETFS 3124		3
ET Prof. Seminar (or ETFS3611) (W,O)	ETGR3071		1
Engineering Economics	ETGR 3222		3
Chemistry	CHEM 1251		3
Intro to Industrial/Organizational Psych	PSYC 2171		3
Total Hours			16

Spring - Even Years

Course Name	Prefix & #	Grade	Hrs
Major Elective ₄			3
Principles of Fire Behavior	ETFS 3103		3
Comm. Threat Asse. & Mitigation	ETFS 4123		3
Global and Intercultural Connections	LBST 2102		3
State and Local Government	POLS 3119		3
Total Hours			15

Senior Year

Fall - Even Years

Course Name	Prefix & #	Grade	Hrs
Active Fire Protection	ETFS 3144		3
Major Elective ₄			3
Advance Fire Service Admin.	ETFS 4323		3
Ethical Issues and Cultural Critique ₃	LBST 221X ₃		3
Organizational Psychology	PSYC 3174		3
Total Hours			15

Spring - Odd Years

Course Name	Prefix & #	Grade	Hrs
Industrial Hazards and Electricity	ETFS 3123		3
Performance-based Fire Safety	ETFS 4233		3
Research Methodology (W,O)	ETFS 4243		3
Administrative Behavior	POLS 3126		3
Major Elective ₄			3
Total Hours			15

Total Required for BSET (FSET) 125

Notes :

1. Social Science Elective - choose from ANTH 1101, GEOG 1105, ECON 1101, 2101, POLS 1110, or SOCY 1101
2. Directed Electives- are chosen jointly by the student and advisor (W Goal-ENGL 2116, PHIL 2102 or another Writing Intensive)
3. LBST 110X- choose from (1101 - Dance, 1102 - Film, 1103 - Music, 1104 - Theater or 1105 - Visual Arts). LBST 221X - choose from (2211, 2212, 2213, 2214 or 2215)
4. Major Electives -to be selected from approved major elective course list

Approved Plan for graduation: _____

Date: _____

A.2 Proposed Catalog Copy of FPET Courses

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 (with emphases in General Civil Engineering Technology or Construction Engineering Technology); Electrical Engineering Technology (with emphases in Electronics Engineering Technology or Computer Engineering Technology); Fire Safety Engineering Technology (**with emphases in Fire Safety Engineering Technology and Fire Protection Engineering Technology**); and Mechanical Engineering Technology.

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 Engineering Technology emphasis**) are offered over the Internet to part-time students.

BACHELOR OF SCIENCE IN ENGINEERING TECHNOLOGY (BSET)

- Fire Safety Engineering Technology, which 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.

Prerequisites for admission to the Fire Safety Engineering Technology Program.

For the Fire Safety emphasis, 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 lab (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)
 - o Introduction to Fire Protection
 - o Fire Prevention and Public Education
 - o Fire Detection and Fire Investigation
 - o Building Construction
 - o Inspections and Codes
 - o Sprinklers and Automatic Alarms
 - o Fire Protection Law
 - o Fire Fighting Strategies
 - o Chemistry of Hazardous Materials
 - o Hydraulics and Water Distribution

o Managing Fire Services

For the Fire Protection emphasis, students transferring with an AAS degree will be evaluated on case by case basis.

ETFS 3103L. Principles of Fire Behavior Lab (1) (W). Prerequisites: 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 4233. 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)

ETFS 3242L. Fire Testing and Measurement Lab (1) (W). Prerequisites: Must be in the senior year in the fire protection track. 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)

ETFS4344. 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)

ETFS4344L. Structural Fire Safety Laboratory (1) (W). Prerequisites: ETFS 3103 and ETME 3123. This course provides overall instruction and hands-on experience with fire science related to the material discussed in the 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

Firstly, 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 yearly. 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 fitting 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 ETFS advisory board members during two recent board meetings at UNCC. The advisory board members come from large local companies in North Carolina that employ FP engineers.

Secondly, there are two groups of students currently attending the ETFS 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 track meets the needs for the first group of students. Therefore, a new Fire Protection Engineering Technology track is needed for the second group of students. This

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>.

track will prepare students to perform fire protection engineering analysis, design, and research. It will also lead to PE licensure in fire protection.

Thirdly, the Department of Engineering Technology and Construction Management has proposed a Master's program in Fire Protection and Administration (MFPA). The proposed Fire Protection track will provide student streamlines for the new Master's program.

In summary, the proposed new Fire Protection track will help produce more FPEs to meet national and regional demands, will serve ETFS students better, and will also provide students for the newly proposed 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 track 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 FPET track will diversify the FSET program to meet students' needs. It will improve the quality of both tracks, allowing the FSET track students to concentrate more on qualitative issues, and preparing the FPET track students to reach their engineering and technologically oriented professional goals. With two tracks clearly defined, the instructor can choose topics according to the needs or requirements of each track. Both the instructors and students can benefit from offering the right courses to the right students. All new FPET courses will help improve the MFPA program as well. If any student intending to enroll in the MFPA program but coming from a field other than FP, he/she can take the new FPET courses in preparation for the masters program.

C. IMPACT.

1. The primary group of students served by this proposal will be those undergraduate students who enroll in the Fire Protection Engineering Technology track .
2. The new track will strengthen the existing Fire Safety Engineering Technology undergraduate program (will become FSET track), the Master program in Fire Protection and Administration, and other degree programs in Engineering Technology. The proposed FPET track will strengthen other engineering programs at UNC Charlotte. For example, students in the College of Engineering can take FPET courses to broaden their education in fire protection and to increase their employment opportunities in fire protection engineering.

- a. Once the FPET track is fully established, the required courses will be offered once a year.
- b. The delivery of the new FPET track 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 FPET track courses will have no effect on enrollment in existing undergraduate courses.
- e. N/A.
- f. No areas of the existing catalog will be affected.

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 at 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 is 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
All courses reside within the department so no outside consultation is required.

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.

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

G. ATTACHMENTS

1. Attach relevant documentation of consultations with other units.
2. For undergraduate courses attach course outline(s) including basic topics to be covered and suggested textbooks and reference materials with dates of publication.
3. For Graduate Courses attach a course syllabus. Please see **Boiler Plate for Syllabi for New/Revised Graduate Courses.**



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 x
- 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

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
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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 4233 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

FSET 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

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ETFS 4344 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	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

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ETFS 4344L 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 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