

ESTABLISHMENT OF A MASTERS DEGREE IN FIRE PROTECTION AND ADMINISTRATION

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

NEW GRADUATE CURRICULUM PROPOSAL

COURSE AND CURRICULUM PROPOSAL FROM: ENGINEERING TECHNOLOGY

A. PROPOSAL SUMMARY AND CATALOG COPY.

1. SUMMARY

The Department of Engineering Technology and Construction Management proposes the creation of the Master of Fire Protection and Administration (MFPA) degree program. The program will consist of a common core and a concentration in either Fire Protection or Fire Administration. Students enrolled can choose between two concentrations, fire protection or administration. The fire protection concentration prepares fire protection professionals to use modern fire protection methodologies, techniques and tools for fire protection design, fire investigation, industrial fire safety, key infrastructure security, safety assessment, and other fire safety related matters. The administration curriculum prepares those who are engaged in occupations in the fire, emergency services, and safety fields to effectively manage the administrative decision-making requirements of both public and private entities.

The following 21 new graduate level courses will be created and developed:

MFPA 5123	Human Behavior in Fire	3 credits
MFPA 5132	Fire and Building Codes, Standards and Practices	3 credits
MFPA 5150	Human Resource Management in Emergency Services	3 credits
MFPA 5223	Industrial Safety and Facilities Management	3 credits
MFPA 6103	Fire Modeling	3 credits
MFPA 6113	Fire Failure Analysis	3 credits
MFPA 6120	Public and Private Sector Interoperability	3 credits
MFPA 6124	Fire Service and the Community	3 credits
MFPA 6126	Arson	3 credits
MFPA 6144	Fire Protection Systems	3 credits
MFPA 6164	Fire Science Laboratory	3 credits
MFPA 6203	Fire Dynamics	3 credits
MFPA 6232	Structural Fire Safety	3 credits
MFPA 6243	Research Investigation	3 credits
MFPA 6244	Fire Detection and Smoke Management	3 credits
MFPA 6252	Law and Fire Safety	3 credits
MFPA 6255	Leadership/Conflict Management in Public Emergency Services	3 credits
MFPA 6260	Organization and Management of Public Fire Protection	3 credits
MFPA 6270	Budgeting, Grants, Contracts and Finance in Emergency Services	3 credits
MFPA 6800	Independent Study	3 credits
MFPA 6900	Thesis	1-6 credits

MFPA 5123 Human Behavior in Fire (3)

This course covers essential bodies of knowledge on how people tend to react in fire emergencies, and how that affects training, communication, evacuation, and building fire safety design. Topics include: individual decision processes and behavior, modeling of people movement, calculation methods for egress prediction, egress design, and fire safety signs and alarm systems.

MFPA 5132 Fire and Building Codes, Standards and Practices (3)

The study of building and fire codes and regulations as they relate to the prevention and incidence of building and structural fires. Topics include: History of fire safety regulation development; building fire characteristics, fire test methods, and fire safety of buildings and structures; contemporary building and fire codes, practices, and their enforcement.

MFPA 5150 Human Resources Management in Emergency Services (3)

A study of the context of public personnel fire/emergency services related administration; basic functions of job evaluation and compensation, employee rights and responsibilities; the legal constraints including equal opportunity, health and safety, collective bargaining; government productivity.

MFPA 5223 Industrial Safety and Facilities Management (3)

Investigation and analysis of hazard control principles relating to the management of personnel, facilities, and equipment, including control procedures, work-task analysis, risk identification and countermeasures, safety training, and pertinent safety management techniques.

MFPA 6103 Fire Dynamics (3)

This course introduces students to fundamentals of fire and combustion and is intended to serve as the first exposure to fire dynamics phenomena. The course includes fundamental topics in fire and combustion such as thermodynamics of combustion, fire chemistry, premixed and diffusion flames, solid burning, ignition, plumes, heat release rate curves, and flame spread. These topics are then used to develop the basis for introducing compartment fire behavior, pre- and postflashover conditions and zone modeling. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

MFPA 6113 Fire Failure Analysis (3)

This course provides knowledge for the development of fire investigation and reconstruction as a basis for determining fire cause and origin and evaluating and improving fire safety design. Accident investigation theory and failure analysis techniques such as fire re-creation testing and modeling are presented. Fire dynamics and computer modeling are applied to assess possible fire scenarios and verify hypotheses of causes and origins of fire incidents. The product liability aspects of failure analysis are presented. Topics include principles of fire reconstruction, use of standard and non-standard test methods, fire pattern analysis, and arson crime scene investigation. Application of course materials is developed through projects involving actual case studies.

MFPA 6120 Public and Private Sector Interoperability (3)

A study of multi-agency interoperability and the effective organization and management of emergency resources at various fire and large-scale emergency incidents. Includes a review of national standards and federal regulations impacting emergency incident management. Case

studies of actual and theoretical incidents will be used to reinforce command and control concepts.

MFPA 6124 Fire Service and the Community (3)

Theoretical concepts of public service to build an understanding of how the fire service fits within the community.

MFPA 6126 Arson (3)

This course utilizes lecture and case studies of arson fires that were started for various reasons, including financial gain, revenge and to conceal other crimes. The criminal intent and the psychological aspects of the fire setter are discussed.

MFPA 6144 Fire Protection Systems (3)

An advanced study of various fire protection systems in regard to contemporary fire and life safety problems. Topics include: process of fire and smoke development, principles of active fire suppression and detection systems, hydraulics, automatic sprinkler systems, passive fire protection systems, structural fire resistance, installation and maintenance of fire protection systems.

MFPA 6164 Fire Science Laboratory (3)

This course provides overall instruction and hands-on experience with fire-science-related experimental measurement techniques. The objective is to expose students to laboratory-scale fire experiments, standard fire tests and state-of-the-art measurement techniques.

MFPA 6203 Fire Modeling (3)

Modeling of compartment fire behavior is studied through the use and application of two types of models: zone and field. The zone model studied is CFAST. The field model studied is FDS. Focus on the understanding of each of these models is the primary objective in terms of needed input, interpretation of output and limitations. Additional fundamental understanding of fire models is gained via a student developed model. A working student model is required for successful completion of the course. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

MFPA 6232 Structural Fire Safety (3)

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, structural fire safety of typical materials and their components (such as steel, concrete, timber, plastics, glass etc.), assessment and repair of fire-damaged structures.

MFPA 6233 Performance-Based Design (3)

This course covers practical applications of fire protection engineering principles to the design of buildings. Both compartmented and non-compartmented buildings will be designed for criteria of life safety, property protection, continuity of operations, operational management and cost. Modern analytical tools as well as traditional codes and standards are utilized. Interaction with architects and code officials, and an awareness of other factors in the building design process are incorporated through design exercises and a design studio.

MFPA 6243 Research Investigation (3)

This course provides students with opportunities in conducting research to tackle fire safety related real-world problems. With guidance from faculty members, students can work individually or as a team on a one-year project. Students are afforded unlimited possibilities for learning and achievement.

MFPA 6244 Fire Detection and Smoke Management (3)

This course addresses the fundamentals and practices of fire detection and alarm and smoke management. Topics include: principles of fire detection, fire alarm technology, and contemporary fire detection and alarm systems; principles applicable to the design and analysis of smoke management systems; factors affecting smoke movement; smoke hazard assessment; airflow in buildings, performance characteristics of smoke control and management systems.

MFPA 6252 Law and Fire Safety (3)

Responding to natural and manufactured building hazards requires a complex legal environment, including regulation and liability. Key topics include the use of model codes, administrative regulation, retrospective codes, federal preemption, arson, performance based codes, risk based regulation, engineering malpractice, product liability and disaster investigation.

MFPA 6255 Leadership/Conflict Management in Public Emergency Services (3)

The role of the administrator as a focal point in social change and the management of the conflict, which occurs. Perspectives on the negotiation and bargaining process will be reviewed.

MFPA 6260 Organization and Management of Public Fire Protection (3)

A presentation of modern management principles and techniques to the organization and delivery of the array of services that communities have come to expect from the fire service. The traditional and evolving roles of the fire service to protection, prevention, risk analysis and community service are also considered.

MFPA 6270 Budgeting, Grants, Contracts and Finance in Emergency Services (3)

This course works to develop the understanding of strategic planning, contracting and budgeting practices as well as grant proposal writing with the emphasis on contract administration skills necessary to operation of a functioning governmental entity.

MFPA 6800 Independent Study (3)

The MFPA program offers independent study and special study courses to allow students to pursue studies in areas for which there are no approved formal courses. Independent study courses can only be taken on a P/F basis. Special study courses can be taken for a grade if the paperwork indicates it will be taken A/F. Each requires a title, justification, and the method of evaluation. Such courses may be used to satisfy degree requirements.

MFPA 6900 Thesis (1-6)

The thesis should be a scholarly discourse on a topic approved by the student's committee. It should demonstrate the student's ability to perform independent research of professional quality. Students are required to hold regularly scheduled meetings with their committee chairman and, if necessary, their advisory committee members to keep them informed of progress. Detailed guidelines for publication of the thesis are specified in the Graduate Catalog. The thesis is expected to be well organized and written clearly. As a guideline, the style, organization, and standards of the thesis shall be consistent with those for papers in the Journal of Fire Protection Engineering. The original copy of the thesis must be electronically submitted to the Graduate

School and a hard copy must be submitted to the ET department. The title of the degree, which appears on the cover page, is Fire Protection and Administration.

B. JUSTIFICATION.

1. The creation of the MFPA program addresses the need for a graduate level program in the fire discipline in North Carolina. No similar programs have been offered in North Carolina and, nationwide, there are few schools that offer a master's program in fire protection or fire safety. Many engineers that work in this field now have degrees in other engineering disciplines, and are trained in fire protection on the job by their employers. In addition, The National Council of Examiners for Engineering and Surveying (NCEES) has changed their model law effective in the year 2015. At that time, engineers desiring to sit for the P.E. exam will be required to have a B.S. degree plus an additional 30 credits. A recent survey conducted by SFPE has shown that Fire protection engineers who have a P.E. license earn between \$10,000 and \$15,000 more per year than their counterparts without a P.E. license, but with similar length of experience. An overwhelming majority of large employers of Fire Protection (FP) engineers indicated they currently have difficulty recruiting enough qualified FP engineers. They also predicted coming recruitment problems in the next few years. Similar market demand and supply situation exists for Fire Administration (FA) professionals. This will encourage many students to continue education at the graduate level as an avenue to pursue professional licensure.

It is estimated that the initial enrollment would range from 15 to 20 students depending upon time of approval and subsequent recruiting efforts. Enrollments are expected to increase to 25-30 per year within a few years. These estimates are considered conservative given the high demand of professionals in fire safety and emergency preparedness areas. For example, The Department of Fire Protection Engineering at Worcester Polytechnic Institute has about 100 active graduate students in fire protection engineering, plus 76 undergraduates who are taking part in a five-year program that leads to a graduate degree in fire protection engineering. WPI typically graduates 30–35 students per year. The same FP program at the University of Maryland typically enrolls 80 undergraduate and 25 graduate students, and about 30 students graduate each year.

The needs in both private and public sectors in North Carolina and the whole southeast region provide unique opportunities for a MFPA program, including outreach and collaboration with local, state and regional fire and emergency related communities. Many fire safety and emergency preparedness practicing professionals (including some recent UNC Charlotte FSET graduates) in the Charlotte metropolitan area have showed strong interest in pursuing a master's degree such as the proposed MFPA program. Internally, there is interest among current students at UNC Charlotte and its College of Engineering for such a program. An informal survey conducted by Prof. Jeff Kimble at UNC Charlotte posted online in October 2004 had 253 responses, 220 out of the 253 indicated they would pursue a degree such as the one proposed if it were available.

2. Admission into the MFPA program will be consistent with the requirements for the graduate school. In addition the following condition will apply: For the Fire Protection concentration, transcript(s) showing a baccalaureate degree from an

accredited institution with a satisfactory grade point average (GPA) in engineering, engineering technology, or a related technical or scientific discipline.

For the Fire Administration concentration, transcript(s) showing a baccalaureate degree from an accredited institution with a satisfactory GPA in engineering, engineering technology, emergency management, or a related discipline.

Satisfactory score on the GRE General Test is also required. For those whose native language is not English, acceptable scores on the English proficiency tests are required (per the Graduate School's requirement).

3. See attached catalog copy; course numbers are consistent with the University policy on course numbering.
4. The proposed MFPA graduate program meshes nicely with the institutional mission and strategic plan. The program will address the broad areas of concern listed in the mission statement, specifically areas three (Urban and Regional Development) and seven (Applied Sciences and Technologies)

As the first graduate level Fire Protection and Administration program, or more directly, the first fire related graduate program of any description in the state of North Carolina and the entire Southeastern region of the United States, the program will provide opportunities for students all across the region to receive an advanced degree in their chosen field. Moreover this will establish UNC Charlotte as the recognized leader in the southeast in the field of fire protection and administration. Additionally, the graduate program will further assist the Department of Engineering Technology and Construction Management and its faculty in becoming active participants in the institutional goal of raising the University's graduate research and scholarly profile.

C. IMPACT.

1. The primary group of students served by this proposal will be those graduate students who enroll to seek the MFPA degree.
2. The proposed program will strengthen the existing Fire Safety Engineering Technology undergraduate program and other degree programs in Engineering Technology. The proposed MFPA program will strengthen other Engineering programs at UNC Charlotte. For example, students in Mechanical or Civil Engineering can take MFPA courses and prepare for their P.E. exams in fire protection engineering.
 - a. Once the MFPA degree program is fully established and enrolled, the required core courses will be offered once a year. Elective courses will be offered on an on-demand basis depending on student interest. At steady state enrollment, it is anticipated that most elective courses will be offered once every year or every other year.
 - b. The delivery of the MFPA will not affect the delivery of the existing undergraduate courses.

- i. Anticipated enrollment in the courses should be approximately 10 persons
- d.** Enrollment in the MFPA course will have no effect on enrollment in existing undergraduate courses.
- e.** N/A
- f.** No areas of the existing catalog will be affected.

Engineering Technology

- **MS in Construction and Facility Management (MSCFM)**
- **Master of Fire Protection & Administration (MFPA)**

Department of Engineering Technology

274 Smith Building
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Graduate Director

Dr. Anthony L. Brizendine

Graduate Faculty

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John Hildreth, Assistant Professor
Steven Kuyath, Associate Professor
Maciej Noras, Assistant Professor
Carlos Orozco, Associate Professor
Peter Schmidt, Assistant Professor
Deborah Sharer, Associate Professor
Barry Sherlock, Professor
Jozef Urbas, Associate Professor
Sheng-Gou Wang, Professor
Aixi Zhou, Assistant Professor

Faculty Emeritus

Cheng Liu, Professor Emeritus

Programs of Study

The Department of Engineering Technology provides opportunities for discipline-specific and multidisciplinary graduate-level education in construction and facility management and closely related areas.

Advanced course work and research are used to enhance professional development, improve technical competency, and initiate a life-long learning experience.

MASTER OF FIRE PROTECTION AND ADMINISTRATION

Admission Requirements

- Admission into the MFPA program will be consistent with the requirements for the graduate school. In addition the following condition will apply:
- For the Fire Protection concentration, transcript(s) showing a baccalaureate degree from an accredited institution with a satisfactory grade point average (GPA) in engineering, engineering technology, or a related technical or scientific discipline.
- For the Fire Administration concentration, transcript(s) showing a baccalaureate degree from an accredited institution with a satisfactory GPA in engineering, engineering technology, emergency management, or a related discipline.
- Satisfactory score on the GRE General Test is also required. For those whose native language is not English, acceptable scores on the English proficiency tests are required (per the Graduate School's requirement).
- Three positive letters of recommendation
- An essay detailing the applicant's motivation and career goals, along with any specific research and training interests.
- Other credentials as required by the Graduate School

Application Deadline

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

Assistantships

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

Tuition Grants

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

Degree requirements

The minimum requirement for the MFPA degree is 36 credit hours beyond the baccalaureate degree, and a minimum of 30 hours of formal course work. Students enrolled will 1) take a common core of 15 credits which includes study in both fire protection

and fire administration; 2) choose additional concentrated study of 9 credits in either fire protection or fire administration, and 3) select 6 credits of directed elective from thesis or non-thesis options. Distance students will be directed toward the non-thesis option while resident students may complete either option.

Admission to Candidacy Requirements

Each student must complete a plan of study to be approved by their advisor. The Plan of study must be approved upon the successful completion of eighteen credit hours of graduate work. The plan of study must be approved by the conclusion of the semester in which the 18th hour is accumulated.

Upon completion of eighteen hours of graduate work, each student must file an Admission to Candidacy to the Graduate School by the published deadline for the semester of graduation.

Application for Degree

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

Time limits for completion.

Students are expected to take no more than six years to complete the program as per Graduate School rules.

Transfer Credit

Up to six hours of approved coursework may be transferred from appropriately accredited graduate programs. Only courses in which the student earned a grade of B or better may be transferred

Additional Information

Additional requirements may be listed as per the requirements of the UNC Charlotte graduate catalog of the year of the applicant's admission into the program.

Core Courses

All students must complete the following 15 credit common core:

MFPA 5123 Human Behavior in Fire
MFPA 5132 Fire and Building Codes, Standards and Practices
MFPA 5223 Industrial Safety and Facilities Management
MFPA 6144 Fire Protection Systems
MFPA 6244 Fire Detection and Smoke Management

Students select one of the following concentration cores:

Fire Administration Concentration Core (9-credit hours):

MFPA 5150 Human Resource Management in Emergency Services
MFPA 6120 Public and Private Sector Interoperability
MFPA 6124 Fire Service and the Community

Fire Protection Concentration Core (9-credit hours):

MFPA 6103 Fire Modeling
MFPA 6203 Fire Dynamics
MFPA 6232 Structural Fire Safety

Students select 6 hours of the following directed electives:

MFPA 6113 Fire Failure Analysis
MFPA 6126 Arson
MFPA 6164 Fire Science Laboratory
MFPA 6243 Research Investigation
MFPA 6252 Law and Fire Safety
MFPA 6255 Leadership/Conflict Management in Public Emergency Services
MFPA 6260 Organization and Management of Public Fire Protection
MFPA 6270 Budgeting, Grants, Contracts and Finance in Emergency Services
MFPA 6800 Independent Study
MFPA 6900 Thesis
FMET 5165 Building Energy Management
FMET 5270 Operation of Constructed Facilities

Capstone Experiences

Students pursuing a master's degree in fire protection and administration have two options to complete the 36-credit hour program.

- a) 30 hours of course work plus 6 hours of thesis project
- b) 36 hours of course work and a comprehensive examination.

Both options require the formation of a program committee.

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

All non-thesis students must complete an additional 6 credit hours of major elective coursework within their

technical specialty and to complete a formal comprehensive examination.

(www.et.uncc.edu) provides current areas of research conducted by the program faculty.

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

Advising

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

Program Committee

The Program Committee shall consist of at least three graduate faculty members. A graduate faculty from outside the ET department or from outside the student's major area-of-study may serve as a member of the Program Committee. The student's ET graduate advisor shall chair the committee.

Research Opportunity/Experience

Students in the fire protection and administration enjoy a curriculum with opportunities for interdisciplinary research, study abroad, and active participation in a growing research program. Programs of study can be tailored to suit individual needs and interests. The ET web site

Courses in Fire Protection and Administration

MFPA 5123. Human Behavior in Fire (3)

This course covers essential bodies of knowledge on how people tend to react in fire emergencies, and how that affects training, communication, evacuation, and building fire safety design. Topics include: individual decision processes and behavior, modeling of people movement, calculation methods for egress prediction, egress design, and fire safety signs and alarm systems.

MFPA 5132. Fire and Building Codes, Standards and Practices (3)

The study of building and fire codes and regulations as they relate to the prevention and incidence of building and structural fires. Topics include: History of fire safety regulation development; building fire characteristics, fire test methods, and fire safety of buildings and structures; contemporary building and fire codes, practices, and their enforcement.

MFPA 5150 . Human Resources Management in Emergency Services (3)

A study of the context of public personnel fire/emergency services related administration; basic functions of job evaluation and compensation, employee rights and responsibilities; the legal constraints including equal opportunity, health and safety, collective bargaining; government productivity.

MFPA 5223. Industrial Safety and Facilities Management (3)

Investigation and analysis of hazard control principles relating to the management of personnel, facilities, and equipment, including control procedures, work-task analysis, risk identification and countermeasures, safety training, and pertinent safety management techniques.

MFPA 6103. Fire Dynamics (3)

This course introduces students to fundamentals of fire and combustion and is intended to serve as the first exposure to fire dynamics phenomena. The course includes fundamental topics in fire and combustion such as thermodynamics of combustion, fire chemistry, premixed and diffusion flames, solid burning, ignition, plumes, heat release rate curves, and flame spread. These topics are then used to develop the basis for introducing compartment fire behavior, pre- and postflashover conditions and zone modeling. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

MFPA 6113. Fire Failure Analysis (3)

This course provides knowledge for the development of fire investigation and reconstruction as a basis for determining fire cause and origin and evaluating and improving fire safety design. Accident investigation theory and failure analysis techniques such as fire re-creation testing and modeling are presented. Fire dynamics and computer modeling are applied to assess possible fire scenarios and verify hypotheses of causes and origins of fire incidents. The product liability aspects of failure analysis are presented. Topics include principles of fire reconstruction, use of standard and non-standard test methods, fire pattern analysis, and arson crime scene investigation. Application of course materials is developed through projects involving actual case studies.

MFPA 6120. Public and Private Sector Interoperability (3)

A study of multi-agency interoperability and the effective organization and management of emergency resources at various fire and large-scale emergency incidents. Includes a review of national standards and federal regulations impacting emergency incident management. Case studies of actual and theoretical incidents will be used to reinforce command and control concepts.

MFPA 6124. Fire Service and the Community (3)

Theoretical concepts of public service to build an understanding of how the fire service fits within the community.

MFPA 6126. Arson (3)

This course utilizes lecture and case studies of arson fires that were started for various reasons, including financial gain, revenge and to conceal other crimes. The criminal intent and the psychological aspects of the fire setter are discussed.

MFPA 6144. Fire Protection Systems (3)

An advanced study of various fire protection systems in regard to contemporary fire and life safety problems. Topics include: process of fire and smoke development, principles of active fire suppression and detection systems, hydraulics, automatic sprinkler systems, passive fire protection systems, structural fire resistance, installation and maintenance of fire protection systems.

MFPA 6164. Fire Science Laboratory (3)

This course provides overall instruction and hands-on experience with fire-science-related experimental measurement techniques. The objective is to expose students to laboratory-scale fire experiments,

standard fire tests and state-of-the-art measurement techniques.

MFPA 6203. Fire Modeling (3)

Modeling of compartment fire behavior is studied through the use and application of two types of models: zone and field. The zone model studied is CFAST. The field model studied is FDS. Focus on the understanding of each of these models is the primary objective in terms of needed input, interpretation of output and limitations. Additional fundamental understanding of fire models is gained via a student developed model. A working student model is required for successful completion of the course. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

MFPA 6232 . Structural Fire Safety (3)

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, structural fire safety of typical materials and their components (such as steel, concrete, timber, plastics, glass etc.), assessment and repair of fire-damaged structures.

MFPA 6233. Performance-Based Design (3)

This course covers practical applications of fire protection engineering principles to the design of buildings. Both compartmented and non-compartmented buildings will be designed for criteria of life safety, property protection, continuity of operations, operational management and cost. Modern analytical tools as well as traditional codes and standards are utilized. Interaction with architects and code officials, and an awareness of other factors in the building design process are incorporated through design exercises and a design studio.

MFPA 6243. Research Investigation (3)

This course provides students with opportunities in conducting research to tackle fire safety related real-world problems. With guidance from faculty members, students can work individually or as a team on a one-year project. Students are afforded unlimited possibilities for learning and achievement.

MFPA 6244. Fire Detection and Smoke Management (3)

This course addresses the fundamentals and practices of fire detection and alarm and smoke management. Topics include: principles of fire detection, fire alarm technology, and contemporary fire detection and alarm systems; principles applicable to the design and

analysis of smoke management systems; factors affecting smoke movement; smoke hazard assessment; airflow in buildings, performance characteristics of smoke control and management systems.

MFPA 6252. Law and Fire Safety (3)

Responding to natural and manufactured building hazards requires a complex legal environment, including regulation and liability. Key topics include the use of model codes, administrative regulation, retrospective codes, federal preemption, arson, performance based codes, risk based regulation, engineering malpractice, product liability and disaster investigation.

MFPA 6255. Leadership/Conflict Management in Public Emergency Services (3)

The role of the administrator as a focal point in social change and the management of the conflict, which occurs. Perspectives on the negotiation and bargaining process will be reviewed.

MFPA 6260. Organization and Management of Public Fire Protection (3)

A presentation of modern management principles and techniques to the organization and delivery of the array of services that communities have come to expect from the fire service. The traditional and evolving roles of the fire service to protection, prevention, risk analysis and community service are also considered.

MFPA 6270. Budgeting, Grants, Contracts and Finance in Emergency Services (3)

This course works to develop the understanding of strategic planning, contracting and budgeting practices as well as grant proposal writing with the emphasis on contract administration skills necessary to operation of a functioning governmental entity.

MFPA 6800. Independent Study (3)

The MFPA program offers independent study and special study courses to allow students to pursue studies in areas for which there are no approved formal courses. Independent study courses can only be taken on a P/F basis. Special study courses can be taken for a grade if the paperwork indicates it will be taken A/F. Each requires a title, justification, and the method of evaluation. Such courses may be used to satisfy degree requirements.

MFPA 6900. Thesis (1-6)

The thesis should be a scholarly discourse on a topic approved by the student's committee. It should demonstrate the student's ability to perform independent research of professional quality. Students are required to hold regularly scheduled meetings with their committee chairman and, if

necessary, their advisory committee members to keep them informed of progress. Detailed guidelines for publication of the thesis are specified in the Graduate Catalog. The thesis is expected to be well organized and written clearly. As a guideline, the style, organization, and standards of the thesis shall be consistent with those for papers in the Journal of Fire

Protection Engineering. The original copy of the thesis must be electronically submitted to the Graduate School and a hard copy must be submitted to the ET department. The title of the degree, which appears on the cover page, is Fire Protection and Administration.

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.

It is anticipated that this new enrollment stream will warrant the addition of three new faculty members over the next four years to adequately deliver the program. Faculty in the Fire Science program will be added through the campus' faculty line allocation process. These positions will be justified through enrollment growth and student credit hour production targets being met. Additionally, research capability and production will increase as new faculty and graduate students are added.

No adverse effect is anticipated on current faculty loads. In fact, the addition of new faculty hires in this developing construction group will provide additional catalyst for construction research, scholarly publication, and community outreach activity.

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

Jeffrey Kimble, Associate Professor
David Murphy, Associate Professor
Jozef Urbas, Associate Professor
Aixi Zhou, Assistant Professor
Anthony L. Brizendine, Professor
Rosida Coowar, Associate Professor
G. Bruce Gehrig, 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 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
Specify and estimate cost of other new/added resources required, e.g., travel, communication, printing and binding.

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
See attached copy of Library Consultation
2. Consultation with other departments or units

The following departments within the College of Engineering have been consulted concerning this proposal:

The Department of Civil and Environmental Engineering
The Department of Electrical and Computer Engineering
The Department of Mechanical Engineering and Engineering Science

Formal letters, memoranda or email correspondence of endorsement/support from these units are included in Attachment B.

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.

This proposal was initiated by the faculty of the Department of Engineering Technology.

The following were consulted during the initiation of the intent to plan / request to establish process for this program:

- ET and CM Industrial Advisory Boards – Unanimous Support
- Department of Engineering Technology Faculty – Unanimous Vote in Favor
- Lee College of Engineering Academic Policy & Curriculum Committee (CEAPCC) – incorporated all suggestions
- Lee College of Engineering Dean – incorporated all suggestions

This Curriculum Proposal was approved unanimously by the Department of Engineering Technology faculty on September 2, 2008.

2. Other Considering Units

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

The course and curriculum proposal will be subject to the standard faculty governance review processes established by the Department of Engineering Technology, the College of Engineering, the Graduate School, and the University of North Carolina at Charlotte.

G. ATTACHMENTS

1. Attach relevant documentation of consultations with other units.

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

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.

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

The William States Lee College of Engineering

Master of Fire Protection and Administration

MFPA 5123. Human Behavior in Fire. (3)

Prerequisite: permission of department.

Course Description: Individual decision processes and behavior, modeling of people movement, calculation methods for egress prediction, egress design, and fire safety signs and alarm systems. (Fall) (Alternate years)

Objectives: This course covers essential bodies of knowledge on how people tend to react in fire emergencies, and how that affects training, communication, evacuation, and building fire safety design. Upon completion of this course, students will be able to:

- Understand the types of behavior that people exhibit in fire situations
- Describe possible physiological impact on building occupants and emergency respondents
- Perform estimates of occupant evacuation time from buildings
- Know basic knowledge in modeling techniques used to estimate evacuation times in large buildings and transportation facilities
- Understand the fundamentals of egress design
- Know basic knowledge in determining means of egress, exit capacity, exit design and maintenance

Instructor: Dr. Aixi Zhou, Assistant Professor

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used

in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

All material submitted for credit must contain all relevant identification information. Such information may include, but not limit to: course number and section number, first and last names, and the assignment identifier (i.e., assignment name or a number).

Multiple page submissions must have sequential page and total page numbers in a consistent location on each page. Multiple page hardcopy submissions must be stapled or firmly attached within a report binder.

Submissions must be professional in appearance; i.e., not illegible, illogical or with miss information. Failure to comply with these guidelines will result in significant point reductions for each violation.

Blackboard and

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Cell Phone

Please set your cell phone in “vibrate” or “silent” mode before each lecture.

Assistance

If you have a disability which requires accommodations (such as note takers, readers, or extended time on assignments and exams), please advise me during the first two weeks of the course so we may arrange reasonable accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Probable Textbooks or Resources:

1. *Egress Design Solutions: A Guide to Evacuation and Crowd Management Planning*, by Jeffrey Tubbs and Brian Meacham, Wiley, 2007. ISBN-10: 0471719560.
2. *NFPA Ready Reference: Human Behavior in Fire Emergencies*. NFPA, 2003.

Topical Outline of Course Contents:

Week*	Topic
1	Awareness of fire and decision processes of the individual
2	Occupant behavior actions in fire
3	Evacuation time: components and estimation
4	Calculation methods for travel time
5	Computer modeling of people movement
6	Computer simulation and modeling of egress design
7	Fundamentals of egress design
8	Review of Life Safety Code
9	Influence of Egress
10	Means of egress and exit capacity
11	Exit facilities and arrangements
12	Lighting and signs
13	Alarm systems
14	Emergency egress and relocation
15	Maintenance of the means of egress

*: Only weeks with lectures are shown.

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

MFPA 5132. Fire and Building Codes, Standards, and Practices (3)

Prerequisite: Permission of department.

Course Description: History of fire safety regulation development; building fire characteristics, fire test methods, and fire safety of buildings and structures; contemporary building and fire codes, practices, and their enforcement. (Fall) (Alternate years)

Objectives: The study of building and fire codes and regulations as they relate to the prevention and incidence of building and structural fires. Upon completion of this course, students will be able to:

- Understand authority, responsibilities and organization issues related to fire prevention and code enforcement;
- Understand concepts and principles of combustion and fire growth
- Know construction and occupancy classifications
- Recognize frequent fire hazards
- Understand access and means of egress requirements
- Understand fire protection and suppression systems
- Demonstrate skill in plans review for fire safety
- Understand how to maintain an acceptable level of building fire safety

Instructor: Dr. Aixi Zhou, Assistant Professor

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

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Submissions must be professional in appearance; i.e., not illegible, illogical or with miss information. Failure to comply with these guidelines will result in significant point reductions for each violation.

Email

It is the responsibility of each student to read his or her email. Course notices are frequently distributed through mass mailings.

Email messages to the instructor will be responded to as soon as possible. You usually get prompt response for emails sent during regular office hours (8AM-5PM) from Monday to Friday. Emails sent after 5PM will likely be answered the next working day. (Emails sent in Friday evening and on weekends will probably be handled on the coming Monday.)

Cell Phone

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Assistance

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Probable Textbooks or Resources:

Fire Inspection and Code Enforcement (6th Ed.), IFSTA, 1998. ISBN 0-87939-150-2

Building Codes Illustrated (2nd Ed), by Francis D.K. Ching and Steven R. Winkel, John Wiley & Sons, 2007. ISBN: 0-471-74189-2.

International Building Code, by International Code Council, Delmar Cengage Learning, 2006. ISBN-10: 1580012515.

International Fire Code, by International Code Council, Delmar Cengage Learning, 2006. ISBN-10: 1580012558.

Fire Prevention: Inspection and Code Enforcement (3rd Ed), by David Diamantes, Delmar Learning, 2006. ISBN-10: 141800944X.

Topical Outline of Course Contents:

Week*	Topic
1	Introduction
2	History of fire safety regulation development
3	Building fire characteristics
4	Fire test methods
5	Fire safety of buildings and structures
6	Building codes - I
7	Building codes - II
8	Building codes - III
9	Building codes - IV
10	Building codes - V
11	Building codes - VI
12	Fire codes - I
13	Fire codes – II
14	Fire codes – III
15	Fire codes – IV

*: Only weeks with lectures are shown.

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

MFPA 5150 Human Resources In Emergency Services (3)

Prerequisite: permission of department.

Course Description:

A study of the context of public personnel fire/emergency services related administration; basic functions of job evaluation and compensation, employee rights and responsibilities; the legal constraints including equal opportunity, health and safety, collective bargaining; government productivity.

Course Objectives:

- **Define the laws pertaining to employment**
- **List the possible consequences of wrongful termination**
- **Describe at least three effective means of evaluation for promotion**
- **List possible strategies for employment development.**

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional method: Lecture, classroom discussion on meaningful level; individual and limited group participation. Pertinent audiovisual media.

Means of Student Evaluation: Graded written reports and oral reports

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

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Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Cell Phone Please set your cell phone in “vibrate” or “silent” mode before each lecture.

Assistance If you have a disability which requires accommodations (such as note takers, readers, or extended time on assignments and exams), please advise me during the first two weeks of the course so we may arrange reasonable accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Textbook Handbook of Human Resources in Government. Stephen E. Condrey

Reference Books *Fire Protection Handbook, 19th Edition, National Fire Protection Association*

Supplementary Materials Per Instructor.

Course Contents:

Week*	Topic
1 & 2	The Changing Role of Human Resources
3	Beyond Politics, The Emergence of New Paradigms
4 & 5	Complexities of the Civil Service System
6	Staffing the Bureaucracy, Recruitment and Retention
7	A More Flexible Workplace: Issues and Implications
8	Valuing Diversity, a Changing Workplace
9	Managing an Aging Workforce
10	Using Technology in the Workplace
11	Public Human Resource Management
12	Organizational Development in Employee Development
13 & 14	Understanding Organizational Climate and Culture
15	Understanding and Using Conflict in the Workplace
16	Strategic Planning for Human Resource Managers

*: Only weeks with lectures are shown.

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

MFPA 5223 Industrial Safety and Facilities Management (3)

Prerequisite: permission of department.

Course Description:

Investigation and analysis of hazard control principles relating to the management of personnel, facilities, and equipment, including control procedures, work-task analysis, risk identification and countermeasures, safety training, and pertinent safety management techniques.

Course Objectives:

- **Describe why industrial facilities all have inherent dangers**
- **List the steps that can be taken to reduce risk in this environment**
- **Develop action plans for specific hazard situations**
- **Define the steps necessary for assuring interoperability in a time of crisis**

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional method: Lecture, classroom discussion on meaningful level; individual and limited group participation. Pertinent audiovisual media.

Means of Student Evaluation: Graded written reports and oral reports

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A

Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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Prerequisite: none

Textbook: Industrial Fire Protection Handbook. 2nd. Ed. R. Craig Scholl

Reference Books: *Fire Protection Handbook, 19th Edition, National Fire Protection Association*

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Introduction and expectations
2 & 3	Historical perspectives, changes in the workplace
4 & 5	Hazard Assessment & Evaluation
6	Building Construction
7	Occupant Characteristics
8	Occupancy Classification
7	Fundamentals of egress design
8	Review of Life Safety Code
9	Means of Egress Requirements
10	Fire Alarm requirements
11	Prefire Planning
12	Working with outside agencies
13 & 14	Using technology to make the workplace safer
14	Putting it all together
15	Employer and Employee buy in

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

MFPA 6103 Fire Dynamics (3)

Prerequisite: Fluid mechanics, Thermodynamics, and Heat and Mass Transfer, or permission from the department.

Course Description:

This course introduces students to fundamentals of fire and combustion and is intended to serve as the first exposure to fire dynamics phenomena. The course includes fundamental topics in fire and combustion such as thermodynamics of combustion, fire chemistry, premixed and diffusion flames, solid burning, ignition, plumes, heat release rate curves, and flame spread. These topics are then used to develop the basis for introducing compartment fire behavior, pre- and post flashover conditions and zone modeling. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

Objectives of the Course: This course is designed to provide students with an understanding of the fundamentals of fire dynamics. It brings together elements of physics, chemistry, fluid mechanics, thermodynamics, heat transfer, combustion, and material science that pertain to fire. The concepts are presented in the form of formulas and charts that can be used in the analysis of fire phenomena. Upon completion of this course, students should be able to:

- Identify and understand different forms of natural fire
- Explain conduction, convection, and radiation heat transfer
- Describe the concept of heat flux and its role in fire hazard assessment
- Understand different modes and criteria for ignition of solid fuels
- Quantify fire spread rates over solids for different configurations
- Predict burning rate and energy release rate of real items
- Calculate flame heights and fire plume characteristics
- Quantify the hazards of combustion products in smoke
- Explain the processes in the development of fire in a compartment

Instructor: Joe Urbas

Phone: (704) 687-3729

FAX: (704) 687-6499

E-mail: jurbas@uncc.edu

Instructional method: Classroom lectures supported by MS PowerPoint slideshows. Problems will be assigned to students. Students are required to complete problems for the next class following the assignment.

Means of Student Evaluation:

There will be two tests and a comprehensive final exam. The types of questions utilized may include but are not limited to the following:

- True/False
- Multiple Choice
- Essay/Short answer

The tests and exam will be based on material covered in class.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade

Grading policy

Assignment	Available Points	Total Points	Percentage Range	Point Range	Final Grade
Test (2)	15 points each	30	90 - 100%	90 - 100	A
Homework (5)	6 points each	30	80 - 89%	80 - 89	B
Final Exam (1)	40 points each	40	70 - 79%	70 - 79	C
			0 - 69%	0 - 69	U
Total Points		100			

Assignments

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Cell Phone

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Assistance

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Probable textbooks or resources:

Drysdale, D., *An Introduction to Fire Dynamics*, Second Edition, John Wiley & Sons, 1999

The SFPE Handbook of Fire Protection Engineering, Edited by DiNenno, Philip J. et al., Society of Fire Protection Engineers

Fire Protection Handbook, Edited by Cote, Arthur E. et al., National Fire Protection Association

Supplementary Materials: Per Instructor, Students must have a PC for homework and scientific calculator for homework and class

Course Contents:

Week*	Topic
1	Course introduction: Historical background, Fire statistics, Fire protection engineering, Prescriptive and performance-based fire codes
2	Fire science and combustion
3	Flammability limits
4	Diffusion flames and fire plumes
5	Heat transfer in fires
6	Ignition of Solids
7	Steady burning of liquids and solids
8	Flame Spread
9	Fire growth – pre-flashover, Fire testing – reaction to fire
10	Fire growth – post-flashover, Spatial separation, Fire resistant construction and testing
11	Fire detection and suppression
12	Smoke production and movement
13	Human behavior in fires

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

MFPA 6113 Fire Failure Analysis (3)

Prerequisite: permission of department.

Course Description:

This course provides knowledge for the development of fire investigation and reconstruction as a basis for determining fire cause and origin and evaluating and improving fire safety design. Accident investigation theory and failure analysis techniques such as fire re-creation testing and modeling are presented. Fire dynamics and computer modeling are applied to assess possible fire scenarios and verify hypotheses of causes and origins of fire incidents. The product liability aspects of failure analysis are presented. Topics include principles of fire reconstruction, use of standard and non-standard test methods, fire pattern analysis, and arson crime scene investigation. Application of course materials is developed through projects involving actual case studies.

Objectives of the Course: The course is designed to present students with the scientific approach of fire investigation and reconstruction consistent with present-day expert witness guidelines in federal and state courts. Upon completion of the course, students should be able to:

- Understand principles of fire re-construction
- Apply basic fire dynamics to fire investigation and re-creation problems
- Conduct fire Pattern Analysis
- Document fire scene
- Analyze arson crime scene
- Apply fire modeling to re-create fires
- Understand fire test methods that can be used for fire re-creation
- Apply various scientific tools in case studies

Instructor: Dr. Joe Urbas and Dr. Aixi Zhou

Phone: (704) 687-3729

FAX: (704) 687-6499

E-mail: jurbas@uncc.edu

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional method: Classroom lectures supported by MS PowerPoint slideshows. Problems will be assigned to students. Students are required to complete problems for the next class following the assignment.

Means of Student Evaluation:

There will be two tests, a comprehensive final exam, and a research paper assigned to individual students or groups of students. The types of questions utilized may include but are not limited to the following:

- True/False
- Multiple Choice
- Essay/Short answer

The tests and exam will be based on material covered in class. The research paper will be based on case studies.

Course Policies

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Grading policy

Assignment	Available Points	Total Points	Percentage Range	Point Range	Final Grade
Test (2)	15 points each	30	90 - 100%	90 - 100	A
Research Paper (1)	30 points each	30	80 - 89%	80 - 89	B
Final Exam (1)	40 points each	40	70 - 79%	70 - 79	C
			0 - 69%	0 - 69	U
Total Points		100			

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Assistance

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Probable textbooks or resources: Forensic Fire Scene Investigation, Second Edition, David J. Icove, John D. DeHaan, Pearson, Prentice Hall, 2009

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1 & 2	Course introduction, Principles of Reconstruction
3	Basic Fire Dynamics
4	Fire Pattern Analysis
5	Fire Scene Documentation
6	Arson Crime Scene Analysis
7	Fire Re-creation as a Means to Verify a Hypothesis
8	Fire Testing
9	Fire Modeling
10	Combination of Fire Testing and Fire Modeling
11- 13	Case Studies
14	Fire Deaths and Injuries
15	Future Tools for the Fire Investigator

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

MFPA 6120 Interoperability in the Public and Private Sectors

Prerequisite: permission of department.

Course Description: A study of multi-agency interoperability and the effective organization and management of emergency resources at various fire and large-scale emergency incidents. Includes a review of national standards and federal regulations impacting emergency incident management. Case studies of actual and theoretical incidents will be used to reinforce command and control concepts.

Objectives:

- Define the problems of multi agency response
- List reasons for communications failure on scene
- Develop mutual aid response guidelines
- Be familiar with new technology to enhance on scene work

Instructor: Jeff Kimble, Associate Professor

Phone: (704) 687- 4177

FAX: (704) 687-6499

E-mail: jkimble@uncc.edu

Instructional method: Lecture, classroom discussion on meaningful level; individual and limited group participation. Pertinent audiovisual media.

Means of Student Evaluation: Graded written reports and oral reports

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Textbook: TBD

Reference Books:

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Overview – and historical perspectives
2	Problems with the communications - it is more than just radios
3	Case Study – 9/11//2001
4	Speaking the same language on the scene
5	A unified command
6	National credentialing
7	Data, telemetry, video, GIS and RFIDs, other new technology
8	Case Study - TBD
9	Using IP for communications
10	NIMS
11	Driven by need or driven by dollars, freeing the spectrum
12	Coordinating a multi agency response
13	Case Study - TBD
14	Planning for the big one
15	Summary

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

MFPA 6124 Fire Service and the Community (3)

Prerequisite: permission of department.

Course Description:

An exploration of time tested and contemporary concepts of successful fire prevention program that interact within the entire community.

Course Objectives:

- Describe the role the fire service plays in the community
- List the steps that can be taken to ensure public acceptance and support of the fire service
- Develop action plans for specific hazard situations
- Define the steps for a comprehensive fire safe community

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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takers, readers, or extended time on assignments and exams), please advise me during the first two weeks of the course so we may arrange reasonable accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Textbook: *How Effective Are Your Community Services? Procedures for Performance Measurement, 3rd ed.*

Reference Books: *Fire Protection Handbook, 19th Edition, National Fire Protection Association*

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Course Expectations, Project emphasis/Literature review discussion Library guest speaker
2 & 3	Historical perspectives, changes in the community
4 & 5	Overview of <i>America Burning</i>
6	Improving fire prevention
7	Use of data
8	Community fire education
9	Community empowerment
10	Program evaluation
11	Prefire Planning
12	Working with outside agencies
13-14	Funding for prevention programs
15	Program enactment
16	Putting it all together

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

MFPA 6126 Arson

Prerequisite: permission of department.

Course Description: This course utilizes lecture and case studies of arson fires that were started for various reasons, including financial gain, revenge and to conceal other crimes. The criminal intent and the psychological aspects of the fire setter are discussed.

Course Objectives:

- **List the reasons why people commit arson**
- **Explain how arson can be used to cover another crime**
- **Describe the steps to determine if a fire is intentional versus accidental**

Instructor: Jeff Kimble, Associate Professor

Phone: (704) 687- 4177

FAX: (704) 687-6499

E-mail: jkimble@uncc.edu

Instructional method: Lecture, classroom discussion on meaningful level; individual and limited group participation. Pertinent audiovisual media.

Means of Student Evaluation: Graded written reports and oral reports

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C

Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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Textbook: Not required, class notes will be distributed.

Reference Books:

Supplementary Materials: Per Instructor.

Course Contents:

Week	Topic
1	Defining arson and unlawful burning
2	Historical perspectives
3	Evidence and indicators
4	Criminal intent
5	Arson for financial gain
6	Arson for revenge
7	Arson to cover other crimes
8	Arson for gratification
9	Juvenile fire setters
10	Intervention and treatment programs
11	Case Study Presentations
12	Case Study Presentations
13	Case Study Presentations
14	Case Study Presentations
15	Case Study Presentations

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

MFPA 6144. Fire Protection Systems. (3)

Prerequisite: permission of department.

Course Description: An advanced study of various fire protection systems in regard to contemporary fire and life safety problems. Topics include: process of fire and smoke development, principles of active fire suppression and detection systems, hydraulics, automatic sprinkler systems, passive fire protection systems, structural fire resistance, installation and maintenance of fire protection systems. (Fall) (alternate years)

Objectives: Upon completion of this course, students will be able to:

- Understand the process of fire and smoke development in a compartment fire
- Understand the principles of active fire suppression and detection systems
- Understand the principles of hydraulics and automatic sprinkler systems
- Understand the principles passive fire protection systems and structural fire resistance
- Understand installation and maintenance requirements of fire protection systems

Instructor: Dr. Aixi Zhou, Assistant Professor

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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Probable Textbooks or Resources:

Fire Protection Systems, by A. Maurice Jones, Delmar Cengage Learning, 2008. ISBN-10: 1401862624.

Fire Detection and Suppression Systems (3rd Ed), by Ted Boothroyd, Intl Fire Service Training Assn, 2005. ISBN-10: 0879392673.

Topical Outline of Course Contents:

Week*	Topic
1	Fire development in a compartment fire
2	Smoke development in a compartment fire
3-4	Active fire suppression and detection systems
5-6	Hydraulics
7-8	Automatic sprinkler systems
9-11	Passive fire protection systems
12-13	Structural fire resistance
14-15	installation and maintenance of fire protection systems

*: Only weeks with lectures are shown.

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

MFPA 6164 Fire Science Laboratory (3)

Pre- or Co-requisite: Basic knowledge in algebra, statistics, calculus, applied mechanics, strength of materials, heat transfer, thermodynamics, fire dynamics, or per instructor's permission.

Course Description:

This course provides overall instruction and hands-on experience with fire science related experimental measurement techniques. The objective is to expose students to fire experiments in a laboratory setting, standard fire tests, state-of-the-art measurement and data techniques and tools.

Objectives of the Course: In this course students will learn general measurement techniques used in a typical fire research laboratory. Upon completion the students should be able to:

- Make temperature and heat flux measurements in fire environments
- 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
- Understand the principles of fire resistance testing

Instructor: Dr. Joe Urbas and Dr. Aixi Zhou

Phone: (704) 687-3729

FAX: (704) 687-6499

E-mail: jurbas@uncc.edu

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional method: Classroom lectures supported by MS PowerPoint slideshows and work in a fire research laboratory. Problems will be assigned to students. Students are required to complete problems for the next class following the assignment.

Means of Student Evaluation:

There will be two tests, a comprehensive final exam, and a practical problem of a laboratory measurement assigned to individual students or groups of students. The types of questions for the tests utilized may include but are not limited to the following:

- True/False
- Multiple Choice
- Essay/Short answer

The tests and exam will be based on material covered in class. The practical problem will require a written report.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Percentage Range	Point Range	Final Grade
Test (2)	15 points each	30	90 - 100%	90 - 100	A
Written Laboratory Report (1)	30 points each	30	80 - 89%	80 - 89	B
Final Exam (1)	40 points each	40	70 - 79%	70 - 79	C
			0 - 69%	0 - 69	U
Total Points		100			

Assignments

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Assistance

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Probable textbooks or resources: Per Instructor.

Course Contents:

Week*	Topic
1	Course introduction, introduction to a fire science laboratory
2	Uncertainty of fire related measurements, data acquisition and reduction techniques
3	Ignitability measurements
4 & 5	Flame spread measurements
6	Oxygen consumption concept
7	Mass loss rate and heat release rate measurements
8	Cone calorimeter
9	Intermediate Scale Calorimeter (ICAL)
10	Large-scale testing and room fire test
11	Measurements of temperature and heat flux
12	Fire-recreation testing
13	Tests to obtain input data in fire models
14	Alarm systems
14 & 15	Fire resistance test methods

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

The William States Lee College of Engineering

Master of Fire Protection and Administration

MFPA 6203 Fire Modeling (3)

Prerequisite: Permission from the department.

Course Description: Modeling of compartment fire behavior is studied through the use and application of two types of models: zone and field. The zone models studied are ASET-QB, FIRM-QB, and CFAST. The field model studied is FDS. Focus on the understanding of each of these models is the primary objective in terms of needed input, interpretation of output and limitations. Additional fundamental understanding of fire models is gained via a student developed model. A working student model is required for successful completion of the course. Basic computational ability is assumed. Basic numerical methods are used and can be learned during the course via independent study.

Objectives of the Course: Upon completion of this course, students should be able to:

- Understand the principles of zone fire modeling
- Understand the principles of field fire modeling
- Use a zone model to conduct modeling of a room fire and interpret the outputs of the model
- Obtain input data for FDS from literature
- Write a simple input file for FDS
- Run FDS to model a simple fire scenario, and interpret the model outputs

Instructor: Joe Urbas

Phone: (704) 687-3729

FAX: (704) 687-6499

E-mail: jurbas@uncc.edu

Instructional method: Classroom lectures supported by MS PowerPoint slideshows. Problems will be assigned to students. Students are required to complete problems for the next class following the assignment.

Means of Student Evaluation:

There will be two tests and a comprehensive final exam. The types of questions utilized may include but are not limited to the following:

- True/False
- Multiple Choice
- Essay/Short answer

The tests and exam will be based on material covered in class.

The students will be required to complete a model of a simple fire scenario and present a complete report.

Course Policies

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Grading policy

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Modeling Report (1)	30 points each	30	80 - 89%	80 - 89	B
Final Exam (1)	40 points each	40	70 - 79%	70 - 79	C
			0 - 69%	0 - 69	U
Total Points		100			

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Probable textbooks or resources: Karlsson, Björn and Quintiere, James G., *Enclosure Fire Dynamics*, CRC Press, 1999

An Introduction to Mathematical Fire Modeling, 2nd edn., Marc L. Janssens, Technomic Publishing Co., Lancaster, PA, USA

Richard D. Peacock, Walter W. Jones, Paul A. Reneke, Glenn P. Forney, *CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) User’s Guide*, NIST Special Publication 1041, National Institute of Standards and Technology, Gaithersburg, MD., December, 2005.

McGrattan, Kevin B.; Klein, Bryan; Hostikka, Simo; Floyd, Jason; *Fire Dynamics Simulator (Version 5) – Users Guide*, NIST Special Publication 1019-5, National Institute of Standards and Technology, Gaithersburg, MD., January 8, 2008.

Forney, Glenn P., *User’s Guide for Smokeview Version 5 - A Tool for Visualizing Fire Dynamics*, NIST Special Publication 1017-1, National Institute of Standards and Technology, January 2008.

Supplementary Materials: Per Instructor, Students must have a PC for homework and scientific calculator for homework and class

Course Contents:

Week*	Topic
1	Course introduction, Basic Compartment Fire Theory
2	Introduction to mathematical Compartment Fire Modeling
3	ASET-QB: A simple Room Fire Model
4	Modifications to ASET-QB
5	The CFAST model: Model description, Case Studies
6	CFD Models – Basic Characteristics
7	Fire Modeling using CFD Models
8	Fire Dynamics Simulator (FDS) - Description
9	FDS User’s Guide
10 - 13	FDS Input File
14	Smokeview and FDS Output
15	FDS Case Study

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

MFPA 6232. Structural Fire Safety. (3)

Prerequisite: Basic knowledge in algebra and calculus, applied mechanics, strength of materials, heat transfer.

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, structural fire safety of typical materials and their components (such as steel, concrete, timber, plastics, glass etc.), calculations, computer models for predicting fire resistance ratings of structural components, and assessment and repair of fire-damaged structures. (on demand)

Objectives: Upon completion of this course, students will be able to:

- Understand design philosophies and methods in fire safety design
- Understand principles of and approaches for structural design for fire safety
- Know basics in behavior of compartment fires
- Understand the behavior of structural materials in fire
- Apply principles to estimating structural fire safety of typical materials and their components
- Demonstrate skills in calculations, computer models for predicting fire resistance ratings of structural components
- Know basics in assessment and repair of fire-damaged structures

Instructor: Dr. Aixi Zhou, Assistant Professor

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

All material submitted for credit must contain all relevant identification information. Such information may include, but not limit to: course number and section number, first and last names, and the assignment identifier (i.e., assignment name or a number).

Multiple page submissions must have sequential page and total page numbers in a consistent location on each page. Multiple page hardcopy submissions must be stapled or firmly attached within a report binder.

Submissions must be professional in appearance; i.e., not illegible, illogical or with miss information. Failure to comply with these guidelines will result in significant point reductions for each violation.

Blackboard and

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Email

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Cell Phone

Please set your cell phone in “vibrate” or “silent” mode before each lecture.

Assistance

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Probable Textbooks or Resources:

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

Structural Design for Fire Safety, A.H. Buchanan, John Wiley & Sons, 2001.

Topical Outline of 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	Properties of Materials at Elevated Temperatures - I
6	Properties of Materials at Elevated Temperatures - II
7	Properties of Materials at Elevated Temperatures - II
8	Calculation Approach for Structural Fire Safety
9	Structural Fire Safety of Concrete Elements
10	Structural Fire Safety of Steel Elements
11	Structural Fire Safety of Composite Elements
12	Structural Fire Safety of Timber Elements
13	Structural Fire Safety of Masonry, Aluminum, Plastics, and Glass
14	Structural Fire Safety of Special Structures
15	Assessment and Repair of Fire-damaged Structures

*: Only weeks with lectures are shown.

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

MFPA 6233 Performance-Based Design (3)

Prerequisite: Permission from the department

Course Description:

This course covers practical applications of fire protection engineering principles to the design of buildings. Both compartmented and non-compartmented buildings will be designed for criteria of life safety, property protection, continuity of operations, operational management and cost. Modern analytical tools as well as traditional codes and standards are utilized. Interaction with architects and code officials, and an awareness of other factors in the building design process are incorporated through design exercises.

Objectives of the course:

The primary objectives of this course are:

1. To document and acknowledge the pioneering efforts of earlier workers and events that made worldwide interest in performance-based fire safety analysis and design possible.
2. To describe basic concepts and to propose a systematic approach to performance-based fire protection engineering.
3. To suggest a role for codes and standards in performance-based design for fire protection.
4. To discuss fire protection engineering tools and skills in the context of performance-based fire protection analysis and design.
5. To understand and be able to describe the steps in performance-based design.
6. To perform a simple building example performance-based design and prepare a Fire Protection Engineering Design Brief.

Instructor: Joe Urbas

Phone: (704) 687-3729

FAX: (704) 687-6499

E-mail: jurbas@uncc.edu

Instructional method: Classroom lectures supported by MS PowerPoint slideshows. Problems will be assigned to students. Students are required to complete problems for the next class following the assignment.

Means of Student Evaluation:

There will be two tests, a comprehensive final exam, and a performance-based design assigned to individual students or groups of students. The types of questions utilized may include but are not limited to the following:

- True/False
- Multiple Choice
- Essay/Short answer

The tests and exam will be based on material covered in class. The performance-based design report will be evaluated.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy

Assignment	Available Points	Total Points	Percentage Range	Point Range	Final Grade
Test (2)	15 points each	30	90 - 100%	90 - 100	A
Performance-based design report (1)	30 points each	30	80 - 89%	80 - 89	B
Final Exam (1)	40 points each	40	70 - 79%	70 - 79	C
			0 - 69%	0 - 69	U
Total Points		100			

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

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Cell Phone

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Assistance

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Probable textbooks or resources: *SFPE Engineering Guide to Performance-Based Fire Protection – Second Edition*, National Fire Protection Association, Society of Fire Protection Engineers, 2000

The SFPE Handbook of Fire Protection Engineering, Edited by DiNunno, Philip J. et al., Society of Fire Protection Engineers

Fire Protection Handbook, Edited by Cote, Arthur E. et al., National Fire Protection Association
Custer, Richard L.P. and Meacham Brian J., *Introduction to Performance-Based Fire Safety*, Society of Fire Protection Engineers, National Fire Protection Association, 1997

Supplementary Materials: Per Instructor, Students must have a PC for homework and scientific calculator for homework and class

Course Contents:

Week*	Topic
1 & 2	Course introduction, Overview of the Performance-Based Fire Protection Analysis and Design Process
3	Defining Project Scope
4	Identifying Goals
5	Defining Stakeholder and Design Objectives
6	Developing Performance Criteria
7	Developing Design Fire Scenarios
8 & 9	Developing Trial Designs
10 -11	Evaluating Trial Designs
12	Selected Key Events in Fire Spread/Growth
13	Developing a Fire Protection Engineering Design Brief
14 -15	Developing a Fire Protection Engineering Design Brief

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

The William States Lee College of Engineering

Master of Fire Protection and Administration

MFPA 6243. Research Investigation. (3)

Prerequisite: permission of department.

Course Description: This course provides students with opportunities in conducting research to tackle fire safety related real-world problems. With guidance from the instructor, students can work individually or as a team on a one-semester project. Students are afforded unlimited possibilities for learning and achievement. (on demand)

Objectives: Upon completion of this course, students will be able to:

- Identify practical problems in fire safety related services
- Construct project requirements and project objectives
- Plan project tasks and project management
- Collect, analyze, and interpret research data
- Report and present research results in a professional fashion

Instructor: Dr. Aixi Zhou and Dr. Joe Urbas

Phone: (704) 687-3729

FAX: (704) 687-6499

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FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Independent research on a specific topic under the instructor's supervision.

Means of Student Evaluation

The followings are required for successful completion of this course: A project outline in the beginning of the semester (25%), a middle term progress report (25%), a final project report (25%), and a project presentation (25%) as the final exam.

Regular communication with the instructor is required for successful completion of this course. Instructor may contact students for further information to help student's project(s).

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Final Point Range	Final Grade
Project Outline	100	100	360-400	A
Middle Term Progress Report	100	100	320-359	B
Final Report	100	100	280-319	C
Final Exam (Presentation)	100	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

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Cell Phone

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Assistance

In the event a student requires extra help or assistance, please feel free to schedule an appointment.

Probable Textbooks or Resources:

Not required.

Topical Outline of Course Contents:

Week*	Topic
1	Introduction and topic selection
2	Research plan outline and abstract
3-4	Research plan development
5	Presentation about research plan: objectives, tasks, approach, available data, and expected outcomes
6-11	Research plan execution
12	Research progress presentation
13-14	Research plan execution
15	Research report and final presentation

*: Only weeks with lectures are shown.

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

MFPA 6244. Fire Detection and Smoke Management. (3)

Prerequisite: permission of department

Course Description: This course addresses the fundamentals and practices of fire detection and alarm and smoke management. Topics include: principles of fire detection, fire alarm technology, and contemporary fire detection and alarm systems; principles applicable to the design and analysis of smoke management systems; factors affecting smoke movement; smoke hazard assessment; airflow in buildings, performance characteristics of smoke control and management systems. (Spring) (alternate years)

Objectives: Upon completion of this course, students will be able to:

- Understand principles of fire detection, fire alarm technology, and contemporary fire detection and alarm systems
- Apply principles to the design and analysis of smoke management systems
- Understand factors affecting smoke movement
- Demonstrate skills in smoke hazard assessment
- Understand airflow in buildings, performance characteristics of smoke control and management systems
- Demonstrate skills in design of smoke management systems

Instructor: Dr. Aixi Zhou, Assistant Professor

Phone: (704) 687-3727

FAX: (704) 687-6499

E-mail: aixi.zhou@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

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Assistance

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Probable Textbooks or Resources:

Design of Special Hazards and Fire Alarm Systems (2nd Ed), by Robert Gagnon, Delmar Cengage Learning, 2007. ISBN-10: 1418039500.

Principles of Smoke Management, by John H Klote, ASHRAE, 2002. ISBN-10: 1883413990.

Topical Outline of Course Contents:

Week*	Topic
1	Principles of fire detection and alarm
2	Gas and vapor detection
3	CO detection
4	Fire detectors
5	Fire alarm systems
6	Fire alarm system interfaces
7	Design of detection systems
8	Fire plumes, flame height and air entrainment
9	Toxicity assessment of smokes
10	Smoke movement in buildings
11	Smoke and heat venting
12	Smoke control
13-15	Design of smoke management systems

*: Only weeks with lectures are shown.

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

MFPA 6252 Law and Fire Safety (3)

Prerequisite: permission of department.

Course Description:

Responding to natural and manufactured building hazards requires a complex legal environment, including regulation and liability. Key topics include the use of model codes, administrative regulation, retrospective codes, federal preemption, arson, performance based codes, risk based regulation, engineering malpractice, product liability and disaster investigation.

Course Objectives:

- **Demonstrate an understanding of personal and departmental liability**
- **Describe applicability of the Fair Labor Standards Act.**
- **Describe what constitutes sexual harassment and step to prevent it**
- **Be able to list relevant court cases that pertain the class topics**

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

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Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Assistance

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Textbook: Legal Considerations for Fire and Emergency Services. J. Curtis Verone. ISBN: 978-1-4018-6571-9

Reference Books: Fire Officer’s Legal Handbook. J. Curtis Verone. ISBN: 978-1-4283-9590-9

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Course Expectations, Project emphasis/Literature review discussion, Library guest speaker
2 & 3	Civil Actions against Fire & Emergency Services
4 & 5	Negligence Actions
6	ADA
7	Use of data
8	Worker’s Compensation
9	Fair Labor Standards Act
10	Family Medical Leave Act
11	OSHA
12	Working with outside agencies
13 & 14	Other Codes and Standards
15	Labor Laws/Collective Bargaining
16	Putting it all together, how does this affect you

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

The William States Lee College of Engineering

Master of Fire Protection and Administration

MFPA 6255 Leadership/Conflict Management in Public Emergency Services (3)

Prerequisite: permission of department.

Course Description:

The role of the administrator as a focal point in social change and the management of the conflict, which occurs. Perspectives on the negotiation and bargaining process will be reviewed.

Course Objectives:

- **Demonstrate an understanding of personal and departmental liability**
- **Describe steps to lead to conflict resolution**
- **Explain the importance of accurate documentation**
- **List proactive steps to prevent conflict within the workplace**

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

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Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

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Blackboard and Email

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Assistance

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takers, readers, or extended time on assignments and exams), please advise me during the first two weeks of the course so we may arrange reasonable accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Textbook: Functional Boss Behaviors. Alan Brunacini

Organizational Leadership, Volume 12: Fire Services in the United States .
Charles Kime

Managing the Unexpected: Assuring High Performance in an Age of Complexity.
Weick & Sutcliffe

Reference Books: Fire Officer’s Legal Handbook. J. Curtis Verone. ISBN: 978-1-4283-9590-9

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Course Expectations, Project emphasis/Literature review discussion, Library guest speaker
2 & 3	Effective Communication within the workplace
4 & 5	Organizing and orchestrating teams
6	Planning for employee development
7	Use of data
8	Coordinate Coordinating team activities
9	Instilling the safety attitude
10	Establishing clear Command/Control
11	Leading by example
12	Working with outside agencies
13 & 14	Conflict Management
15	Role playing as a way to develop leadership skills
16	What’s on the horizon?

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

MFPA 6260 Organization and Management of Public Fire Protection (3)

Prerequisite: permission of department.

Course Description:

A presentation of modern management principles and techniques to the organization and delivery of the array of services that communities have come to expect from the fire service. The traditional and evolving roles of the fire service to protection, prevention, risk analysis and community service are also considered.

Course Objectives:

- **Demonstrate an understanding of modern management theories**
- **Describe the problems within the modern fire service**
- **List the elements of a comprehensive public fire protection program**
- **Develop an action for community involvement in the reducing the fire problem**

Instructor: D. Murphy

Phone: (704) 687-4187

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

The followings are required for successful completion of this course:

- a. Ten in-class quizzes (25%)
- b. A mid-term exam (25%)
- c. A final exam (25%)
- d. A project assignment (25%)

The exams will be based on materials covered. They are to be taken on the day they are given, and no "make-ups" will be allowed without prior arrangement with the instructor. The types of questions utilized in the mid-term and final exams may include but are not limited to the following: True/False, Multiple Choice, Essay/Short Answer, and Analysis and Calculations.

Course Policies

Academic Integrity: The UNC-Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This Code may be modified from time to time. Users are advised to contact the Office of the Dean of Students to assure they consult the most recent

edition. A current version of the code is available online at <http://www.legal.uncc.edu/policies/ps-105.html>.

Attendance: Regular attendance and participation is required for successful completion of this course. Attendance records will be scrutinized for 12 class meetings. Each documented unexcused miss will result in a deduction of 5 points from your total grade.

Grading Policy:

Assignment	Available Points	Total Points	Point Range	Final Grade
Quiz (10)	10 points each	100	360-400	A
Mid-Term Exam	100 points	100	320-359	B
Project	100 points	100	280-319	C
Final Exam	100 points	100	0-279	U
Total		400		

Assignments

All material submitted for credit must be received and acknowledged by the instructor before the relevant deadline.

All material submitted for credit must contain all relevant identification information. Such information may include, but not limit to: course number and section number, first and last names, and the assignment identifier (i.e., assignment name or a number).

Multiple page submissions must have sequential page and total page numbers in a consistent location on each page. Multiple page hardcopy submissions must be stapled or firmly attached within a report binder.

Submissions must be professional in appearance; i.e., not illegible, illogical or with miss information. Failure to comply with these guidelines will result in significant point reductions for each violation.

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Textbook: Emergency Management: Principles and Practice for Local Government, 2 nd ed.

Reference Books: National Fire Protection Handbook , 20th ed. N.F.P.A.

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Course Expectations, Project emphasis/Literature review discussion, Library guest speaker
2 & 3	Development of standards for emergency management and the professionalization of the field
4 & 5	Mitigation, preparedness, response, and recovery at the local level
6	Ideas and strategies for organizing and managing local activities
7 & 8	Emergency management planning, organization, staffing, training, and emergency operations centers (EOCs)
9	Development of a response management strategy
10	Develop and collaborate with networks of public, private, and nonprofit entities
11	Multi Agency coordination
12	Critical issues that shape local emergency management
13 & 14	Understanding the needs of populations with high social vulnerability
15	Building sustainable communities that will be resilient in the event of disaster
16	Define recovery and discuss the recovery planning process

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

The William States Lee College of Engineering

Master of Fire Protection and Administration

MFPA 6270 Budgeting, Grants, Contracts and Finance in Emergency Services (3)

Prerequisite: permission of department.

Course Description:

This course works to develop the understanding of strategic planning, contracting and budgeting practices as well as grant proposal writing with the emphasis on contract administration skills necessary to operation of a functioning governmental entity.

Course Objectives:

- **Describe the politics of public budgeting**
- **Explain the process of writing grants**
- **Explain the process of administering contracts**
- **Define the steps in the procuring goods and services for a public agency**

Instructor: David L Murphy, Associate

Phone: (704) 687-4177

FAX: (704) 687-6499

E-mail: dlmurphy@uncc.edu

Instructional Method

Classroom lectures supported by PowerPoint slideshows and in-class activities such as quizzes, case studies, and group discussions.

Means of Student Evaluation

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me during the first two weeks of the course so we may arrange reasonable accommodations. It is the responsibility of each student to make arrangements with the instructor for additional assistance.

Textbook: *Capital Budgeting and Finance: A Handbook For Local Government, 4th ed. (ICMA)*

Reference Books: *National Fire Protection Handbook , 20th ed. N.F.P.A.*

Supplementary Materials: Per Instructor.

Course Contents:

Week*	Topic
1	Course Expectations, Project emphasis/Literature review discussion Library guest speaker
2	Introduction to the problems
3	The role of budgeting in local government
4	The economic nature of government services
5	Factors influencing local budgets
6	Preparation phase
7	Legislative approval
8	Legislative approval -cont
9	Grant writing
10	Managing conflict through a budget policy
11	Communicating budget information
12	Maintaining budget compliance
13	Budgeting in times of fiscal crisis
14	The accounting system, financial reporting
15	Performance measurement



Consultation on Library Holdings

To: David Murphy
From: Alison Bradley
Date: 4/21/08
Subject: Masters of Fire Protection and Administration program

Summary of Librarian's Evaluation of Holdings:

Evaluator: Alison Bradley **Date:** 4/21/08

Check One:

1. Holdings are superior
2. Holdings are adequate
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 and administration at the Master's level. 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). We also have extensive holdings in the areas of public policy and administration which may be of interest to students in this interdisciplinary program. Student who participate in this degree program as distance education students will be able to take advantage of our full-time distance education librarian's access services, and all students in the program will have access to a subject specialist librarian as well. 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

4/21/2008

Date

Library Holdings for MFPA Proposal

Subject Heading	Total Catalog Entries	Books and Government Documents	Periodical s	Electronic Resource s
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

