



## **Public Safety Management Degree Program Fall 2017, UST 426, 3 Credit Syllabus for Applications of Fire Research**

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### **PROFESSOR**

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Director, Center for Emergency Preparedness

### **INTRODUCTION**

Welcome to the Applications of Fire Research course. As your instructor, I would like to stay in close contact with you. Please feel free to call me any time for assistance at my office @ 216-875-9860. If I am not in, you may e-mail me at [b.becker64@csuohio.edu](mailto:b.becker64@csuohio.edu). I will be happy to return your call.

### **COURSE DESCRIPTION**

This course examines the basic principles of research and methodology for analyzing current fire-related research. The course also provides a framework for conducting and evaluating independent research in the following areas: fire dynamics, fire test standards and codes, fire safety, fire modeling, structural fire safety, life safety, firefighter health and safety, automatic detection and suppression, transportation fire hazards, risk analysis and loss control, fire service applied research and new trends in fire-related research.

### **COURSE PREREQUISITES**

NONE

### **COURSE DELIVERY METHOD**

The Applications of Fire Research course is an ONLINE program, utilizing the Cleveland State University BLACKBOARD system.

### **COURSE GOALS**

At the end of this course, you should be able to understand the rationale that fire research organizations use for conducting fire-related research. You will be able to locate, evaluate, analyze, and interpret current fire-related research independent of the research methodology and approach employed. You will identify a research problem in need of further testing or research and independently complete a literature review and write a research proposal.

## **THE COURSE IS DIVIDED INTO THE FOLLOWING CORE MODULES:**

- Module I: Fundamentals
- Module II: Focusing Your Research Efforts
- Module III: Qualitative Research Methodologies
- Module IV: Quantitative Research Methodologies
- Module V: Applications and Trends in Fire-Related Research

## **COURSE OUTCOMES**

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

1. Locate, evaluate, and analyze fire-related research.
2. Demonstrate the application of fire research to a research problem related to one of the course topics.
3. Conduct a literature review of current research on a fire-related topic.
4. Write a fire-related research proposal.
5. Design a research plan using one or more qualitative and/or quantitative methodologies.

## **COURSE OBJECTIVES**

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

### **Module I: Fundamentals**

1. Consider what research is and why we study it.
2. Understand fire-related research objectives.
3. Analyze and discuss fire research goals and objectives in relation to the National Institute of Standards and Technology (NIS) led technical investigation of the World Trade Center disaster.
4. Research, evaluate, and discuss sources from which information on fire research is available.
5. Identify fire research organizations and programs that have applications to the fire service.
6. Identify areas of fire-related research.
7. Conduct a preliminary review of current research in a chosen fire-related topic.
8. Investigate, evaluate, and interpret research in the area of fire dynamics.
9. Investigate, evaluate, and interpret research in the area of fire test standards and codes.

### **Module II: Focusing Your Research Efforts**

1. Define research and its foundations.
2. Introduce research methods and approaches.
3. Understand the scientific method.
4. Conceptualize a strategy for generating research problems.
5. Formulate a suitable research problem in an area of fire science.
6. Develop a preliminary research proposal outline.
7. Distinguish between testing and experimental research.
8. Compare the results of mathematical fire modeling to full-scale fire testing.

9. Distinguish between small-, medium-, and large-scale tests and when it is appropriate to use them.
10. Understand sampling procedures.
11. Investigate, evaluate, and interpret research in the area of fire safety properties and flammability tests.
12. Investigate, evaluate, and interpret research in the area of fire modeling.

### **Module III: Qualitative Research Methodologies**

1. Develop a familiarity with qualitative research methods and approaches.
2. Apply concepts of qualitative methods to fire-related research.
3. Select appropriate qualitative methods according to the type of research question raised.
4. Interpret conclusions drawn from qualitative methods, based on an analysis of the strengths and weaknesses of the methodology.
5. Conduct a literature review related to a fire research problem.
6. Investigate, evaluate, and interpret research in the area of structural fire safety.
7. Investigate, evaluate, and interpret research in the area of life safety.
8. Investigate, evaluate, and interpret research in the area of firefighter health and safety.

### **Module IV: Quantitative Research Methodologies**

1. Develop a familiarity with quantitative research methods and approaches.
2. Apply concepts of quantitative methods to fire-related research.
3. Apply statistical concepts and data analysis to quantitative research design.
4. Select an appropriate quantitative design when the conditions of the research problem demand measurement of variables and relationships.
5. Select appropriate statistical techniques according to the type of research question raised within a quantitative study.
6. Interpret conclusions drawn from statistics as to whether or not they reflect the true properties of phenomena under study.
7. Design a research project within a fire research subfield, and establish techniques for data gathering and analysis.
8. Investigate, evaluate, and interpret research in the area of automatic detection and suppression.
9. Investigate, evaluate, and interpret research in the area of transportation fire hazards.
10. Investigate, evaluate, and interpret research in the area of risk analysis and loss control.

### **Module V: Applications and Trends in Fire-Related Research**

1. Consider applications of fire-related research to fire safety and prevention.
2. Consider future developments in fire-related research.
3. Propose specific areas for future research and testing.
4. Discuss how your research proposal relates to either applications of fire-related research, future trends in fire-related research, or both.

5. Investigate, evaluate, and interpret research in the area of fire service applied research.
6. Investigate, evaluate, and interpret research in the area of new trends in fire-related research.
7. Complete a formal research proposal in a fire-related field, applying either qualitative or quantitative methods, or a combination of both.

### COURSE READINGS AND MATERIALS

The course texts we will be using are:

***Fire Protection Handbook*** (National Fire Protection Association), Volume I and II, Arthur E. Cote (Editor), 20th edition. Publisher: National Fire Protection Association; ISBN #: 08776547432.

***I Can't Save You But I'll Die Trying: The American Fire Culture.*** Clark, Burton A. (2015). Premium Press America.

***Practical Research Planning and Design***, by Leedy, P & Ormond, Ellis Jeanne. 9th Edition (April 2009). Prentice Hall; ISBN #: 0137152426. **(FREE ONLINE)**

### CLASS PARTICIPATION/COURSE DISCUSSION GUIDELINES

In addition to readings and projects, you are expected to participate in class by responding to discussion questions. These questions are a useful way of formulating an understanding of the material you are reading that goes beyond simply being able to fill in a blank or recite a sentence. Discussion should be more than just giving an opinion or saying whether you agree or disagree; a good discussion response indicates that you read the material assigned and you have processed what you read.

To get credit for participating in the discussion you must post a response to the original topic or question. Response must be at least 250 words. You must also follow up by responding to at least two of your colleagues in 125-word responses. Your postings must always combine your original thinking and opinion with authoritative references. In addition, you should cite your sources where appropriate and check your spelling and grammar.

### COURSE RULES

I appreciate that you are a very busy person. I am a busy person as well. One of the things you should be learning in college is **time management**. I have planned the course to ensure that you have plenty of advance notice about when assignments are due. Therefore, I expect you to complete work on time and to turn your papers in on time. I work hard to get you feedback on things with a short turnaround and that is something you can expect from me.

If you encounter a problem during the semester, or know you have something coming up during this semester, please see me **before the due date** so we can work something out. I am not an unreasonable person, but I do expect that you will manage your time wisely.

Many of us are in the emergency services, myself included, and sometimes that means that we have unexpected events that come up and take up a substantial part of our day or week to resolve. I understand this but I recommend you save my office phone number in your cell phone so you can call me and tell me before the week is up.

If you do not come to me beforehand but instead just turn papers in late, please be aware that **one full letter grade will be deducted** from your score for the paper for each day beyond the due date. Papers 5 or more days late will **not be accepted**. If your work on the course is not complete when the semester ends, I will assume you have done all the work you are going to and I will enter your grade based on what has been done. If you anticipate a problem—please talk to me now—not 2 days after the due date!

### **ACADEMIC INTEGRITY**

My expectation is that the principles of truth and honesty will be rigorously followed in all academic endeavors. All work submitted for this class must be done by you. You are free to discuss your work with others and incorporate their feedback but your writing must be your own. You may incorporate material from books or other sources if it is properly cited. In the Cleveland State University web site, you will find more information about academic integrity and a document you need to submit to me after you complete the review of the academic integrity materials. I encourage you to seek help as needed from your supervisors, friends, colleagues, and me, your instructor. The work you submit for a grade must be your own. I will not tolerate any form of academic dishonesty, especially plagiarism. Simply put, plagiarism is taking credit for someone else's work; taking credit includes receiving some form of favorable compensation for the submitted work.

### **GRADING INFORMATION AND CLASS ACTIVITY DESCRIPTIONS**

Your written assignment responses must follow the APA format and be at least 1500 words in length. You are required to use at least your textbook as source material for your response. All sources used, including the textbook, must be referenced; paraphrased and quoted material must have accompanying citations.

### **WHERE TO SEND ASSIGNMENTS**

Email me all written assignments (b.becker64@csuohio.edu)

## **ACADEMIC POLICIES**

In the Cleveland State University web site, you will find links to important academic policies and other information to help you as you complete your coursework:

- Academic Policies
- Policy and Procedures on Affirmative Action, Equal Opportunity, and Sexual Harassment
- Policy on Academic Integrity
- Policy on Academic Dishonesty and Plagiarism
- Policy on the Grade of Incomplete and Withdrawal
- Policy on the Code of Student Conduct
- Important Information and Procedures
- Course Evaluation Form Information
- Information on Disabled Student Service
- Information about Writing Resources

## **UNIVERSITY/COLLEGE DEADLINES**

For the current semester, the deadline for dropping a course is September 1, 2017. The last day to withdraw from the course is September 8, 2017. The final examination week is December 11 - 16, 2017.

## **STUDENT GRADING**

CSU uses the following letter grades with plusses and minuses. In the Levin College, the letter grades follow this numeric scale:

A = 94-100%

A- = 90-93

B+ = 87-89

B = 83-86

B- = 80-82

C+ = 77-79 (there is no C+ grade for graduate students; C = 70-79 for grad students) C = 70-76 for undergraduates, 70-79 for grad students

D = 60-69 (there is no D for graduate students)

F = 59 and below for undergraduates, 69 and below for graduate students

## **GRADES OF "I" AND "X"**

**X** - The grade of "X" can be assigned by the instructor when an attending/participating student has stopped attending/participating without notification and has not completed all assignments for reasons that cannot be determined by the end of the grading period. An "X" automatically becomes an F if not resolved by the last day of instruction of the following semester. An "X" also will be assigned by the University Registrar when no grade is submitted by an instructor.

**I - INCOMPLETE.** The "I" grade is given when the work in a course has been generally passing, but when some specifically required task has not been completed through no fault of the student.

## **AN "I" GRADE CAN BE ASSIGNED BY THE INSTRUCTOR WHEN ALL THREE OF THE FOLLOWING CONDITIONS ARE MET:**

1. Student is regularly attending/participating in the class and has the potential to pass the course;

2. Student has not completed all assignments and has stopped attending/participating for reasons deemed justified by the instructor; and
3. Student has notified the instructor prior to the end of the grading period.

### **STUDENTS WITH SPECIAL NEEDS**

Educational access is the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Disability Services at (216)687-2015. The Office is located in MC 147. Accommodations need to be requested in advance and will not be granted retroactively. Students should notify the instructor as soon as possible if they have been granted an accommodation through the Office of Disability Services.

### **WRITING ASSISTANCE**

Students with difficulty writing may contact the Writing Center located in Rhodes Tower 124 for assistance. Students should use the American Psychological Association (APA) format for citations and reference pages.

### **PLAGIARISM**

Plagiarism is stealing and/or using the ideas or writings of another in a paper or report and claiming them as one's own. This includes but is not limited to the use, by paraphrase or direct quotation, of the work of another person without full and clear acknowledgment. The penalties for plagiarism are found in full in the Student Handbook (Office of Student Life) under Academic Regulations (Policy on Academic Misconduct) at the following link:

<https://www.csuohio.edu/sites/default/files/StudentCodeOfConduct.pdf>

**COURSE WRITTEN ASSIGNMENTS, DISCUSSION QUESTIONS, AND PROJECTS:**

<b>Assignment</b>	<b>Grade Point</b>
<b>Module 1</b>	
Discussion Question 1	5
Discussion Question 2	5
Written Assignment 1	5
<b>Module 2</b>	
Discussion Question 1	5
Discussion Question 2	5
Written Assignment 2	5
<b>Module 3</b>	
Discussion Question 1	5
Discussion Question 2	5
<b>Module 4</b>	
Discussion Question 1	5
Discussion Question 2	5
<b>Module 5</b>	
Discussion Question 1	5
Discussion Question 2	5
<b>Final Project</b>	<u>40</u>
<b>TOTAL</b>	100

**Please note that the final project carries a huge grade in this course. Attention to detail, research, and articulating yourself in a written format is very important.**

## COURSE SCHEDULE

Semester Week	Discussion / Assignment / Project	Discussion / Assignment / Project DUE DATE
Week 1	Module 1 Discussion 1	September 4, 2017
Week 2	Module 1 Discussion 2	September 11, 2017
Week 3	Module 1 Assignment 1	September 18, 2017
Week 4	Module 2 Discussion 1	September 25, 2017
Week 5	Module 2 Discussion 2	October 2, 2017
Week 6	Module 2 Assignment 1	October 9, 2017
Week 7	Module 3 Discussion 1	October 16, 2017
Week 8	Module 3 Discussion 2	October 23, 2017
Week 9	Module 4 Discussion 1	October 30, 2017
Week 10	Module 4 Discussion 2	November 6, 2017
Week 11	Module 5 Discussion 1	November 13, 2017
Week 12	Break Week	November 20, 2017
Week 13	Module 5 Discussion 2	November 27, 2017
Week 14	Final Project	December 8, 2017

### FINAL COURSE PROJECT

For your final exam, prepare a 5000 word / 10 pages (minimum), APA formatted research project, explaining the **APPLICATION OF FIRE RESEARCH**, as it relates to **FIRE & EMERGENCY SERVICE STAFFING**, utilizing the text "*I Can't Save You But I'll Die Trying: The American Fire Culture.*"

If your jurisdiction does not have a staffing program, then establish one through this program. You have a number of pieces of material from the text, the internet, and this web site which to utilize

A minimum of FIVE (5) references must be utilized and all of the reference citations SHALL be placed within the project. The research project SHALL have an APA formatted cover page, an introduction page, a background and significance page, a Literature review page, a conclusions page, and a reference page.

All sources used, including the textbook, must be referenced, paraphrased and quoted material must have accompanying citations.

Failure to meet the APA format and content guidelines will result in a reduction in grade.

**YOU MAY BEGIN WORKING ON THE FINAL  
COURSE PROJECT IMMEDIATELY!  
THIS PROJECT IS DUE NO LATER THAN  
NOON DECEMBER 8, 2017**

**SUBMIT YOUR FINAL COURSE PROJECT TO [b.becker64@csuohio.edu](mailto:b.becker64@csuohio.edu)**

## [THIS IS AN OVERVIEW OF THE STEP-BY-STEP GUIDELINES FOR PROJECT COMPLETION.](#)

### **Step 1: Preliminary Information Gathering and Website Review**

**Learning Objective:** Conduct a preliminary review of current research in a chosen fire-related topic and evaluate and discuss sources from which information on fire research is available.

### **Step 2: Formulate Your Research Problem/Develop a Preliminary Outline**

**Learning Objective:** Define a research problem and develop a preliminary research proposal outline.

### **Step 3: The Literature Review**

**Learning Objective:** Conduct a literature review related to a fire research problem.

### **Step 4: Research Design and Data Gathering Techniques**

**Learning Objective:** Design a research project within a fire research subfield, and establish techniques for data gathering and analysis.

### **Step 5 (Final Step): Research Proposal Checklist and Submission Instructions for the Research Proposal**

- Length: 8 to 10 pages, not including title page;
  - Margins: 1 inch per side;
  - Must be submitted in MS Word;
  - Spacing: **double space** normal text, but single space tables and reference lists;
  - Font: Arial 12 point;
  - Content sections: At least the following sections must be included, **although your titles may vary to fit your research design:**
    1. Establishment of the research problem or research question;
    2. Literature review;
    3. Hypothesis, **if** it is a causal or correlation study; for other types of research designs, you only need to establish your research objectives;
    4. Research design, with a brief description, following the guidelines provided in Step 2;
    5. Data gathering procedures, with example of instrument(s) if possible;
    6. If you use statistics, describe what statistical procedures you will use and for what; and
    7. References, listed in alphabetical order.
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- Grammar and style norms: [APA Style](#)
  - Written in future tense, and impersonal; as if the study would be performed by the researcher after approval of the proposal; and
  - References: at least 5 references cited in text.

## **FINAL CHECK BEFORE SUBMITTING YOUR PROPOSAL**

**Carefully review your proposal to ensure that the following questions have been addressed and make any necessary final refinements to your research proposal.** Submit your proposal when you are satisfied that your project has all of the pieces in place.

1. Is the problem or research question clearly identified? Is the basic research problem well-formulated, or is it poorly and vaguely structured? Is it stated in a few clear sentences?
2. Has the area of concern regarding the problem been identified; i.e., has the need that exists to research the problem been clarified?
3. Does the literature review provide an adequate theoretical framework for the study? Have relevant sources been used to identify the problem?
4. Is the literature review oriented to identify the background and rationale for the problem, or is it just a perfunctory list of authors and quotes?
5. Are the citations academically acceptable?
6. Has a suitable hypothesis(es) been formulated, or has a suitable research question(s) been stated?
7. Have the variables in the hypotheses been operationally defined?
8. Have objectives for the study been established, e.g., What will be obtained as an outcome? How will the results be used?
9. Is the project and research design well-structured and outlined?
10. Has the research methodology been clearly articulated?
11. Is there a clear correspondence between the stated research goals and the chosen methodology?
12. Have the measurement procedures and/or instruments to be used been identified?
13. Have the sampling methodology and data collection been adequately clarified?
14. Is there an indication about how the data will be analyzed? Are these procedures appropriate to the research goals?
15. Has the importance of undertaking this research been stated, as well as for whom it is important?
16. Is it feasible to research the problem?
17. Is the proposal appropriately written in APA style regarding sections, titles/subtitles, citations, figures, tables, and references?
18. Is each paragraph well-structured in the sense of presenting a main idea and developing it?
19. Do the paragraphs adequately flow in meaning from one to the next?
20. Has the proposal been carefully reviewed in terms of spelling, grammar, and word choice?

# APPLICATIONS OF FIRE RESEARCH

## DISCUSSION QUESTIONS

### Module 1

#### Discussion Question 1

When a fire officer confronts a problem that may have a technological solution, it is more productive to see if such a solution already exists rather than to "reinvent the wheel." Explain your position on this statement

#### Discussion Question 2

Cite four Fire Service Libraries, their locations and purpose

### Module 2

#### Discussion Question 1

Define what "Scientific Research Method" and its components.

#### Discussion Question 2

Define the difference between Qualitative and Quantitative research methods.

### Module 3

#### Discussion Question 1

Explain the five key components to Data Collection Procedures

#### Discussion Question 2

What are the key components to a Literature Review?

### Module 4

#### Discussion Question 1

Define and explain the purpose of Descriptive Research

#### Discussion Question 2

Define the reason and benefits of having a comprehensive Data Analysis program for your organization

### Module 5

#### Discussion Question 1

How does data analysis affect codes and standards?

#### Discussion Question 2

What are the benefits of having a Research Proposal Checklist?

# APPLICATIONS OF FIRE RESEARCH

## WRITTEN ASSIGNMENTS

### **Module 1**

#### **Assignment 1**

Let us begin by discussing a problem that has influenced the emergency services for the past few years and destroyed 4% of Manhattan's total office space. The World Trade Center incident of 9/11 has created a plethora of articles in a variety of trade journals, but let us discuss the way researchers have looked at the incident. A good start to investigate authoritative fire research problems, projects, and reports is the National Institute of Standards and Technology website: <http://wtc.nist.gov>

Your assignment is to address the following questions

- How can this problem be characterized?
- What factors are involved?
- How can these factors be defined in a way that they can be measured?

### **Module 2**

#### **Assignment 2**

Fire Modeling began in the 1950's. Over the last two decades, tremendous progress was made in the field. A model of anything is, simply, a systematic representation of that thing. Thus, for example, we can have thought models (or conceptual models), scale models, and mathematical models.

Your assignment is to address the following questions

- What is fire modeling and its benefits?
- What are the types of fire modeling defined in this chapter and their importance?
- Explain the purpose of "Computational Fluid Dynamics"

### **Module 3**

NO ASSIGNMENT

### **Module 4**

NO ASSIGNMENT

### **Module 5**

NO ASSIGNMENT