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American Public University System

The Ultimate Advantage is an Educated Mind

School of Public Service & Health
Fire Science Management
FSMT287
Fire Protection in Building Construction
3 Credit Hours
8 Week Course
Prerequisite: None

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Instructor Information

Instructor:

Email:

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Course Description (Catalog)

This course is a study in building construction components that relate to fire and life safety, to include a major focus on fire fighter safety. The elements of construction and design of structures are shown to be key factors when inspecting buildings, preplanning fire operations, and operating in emergencies. The student can expect to demonstrate an understanding of building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, and firefighting strategy and tactics; classify major types of building construction;

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analyze the hazards and tactical considerations associated with the various types of building construction; explain the different loads and stresses that are placed on a building and their interrelationships; identify the principle structural components of buildings and demonstrate an understanding of each function; differentiate between fire resistance and flame spread, and describe the testing procedures used to establish ratings for each; classify occupancy designations of the building code; and identify the indicators of potential structural failure as they relate to firefighting safety.

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Course Scope

As fire and life safety professionals, we often arrive at a structure at the worst time. We come on scene when the structure is failing, whether through natural or man-made stresses acting on its component parts. Upon arrival we are called to make split-second decisions that could risk lives. These decisions must be made with often limited or nonexistent information. It is essential that anyone who is in our field of endeavor be aware of the types of construction, a structure's components and the reaction of those components to fire and other emergencies. That knowledge gives the Incident Commander an edge when seconds count. The ability to "read" a structure is vital during responses in order to protect the lives of responders as well as the structure's occupants. Knowledge of a structure's hidden problems allows the professional to plan for not only for safer responses, but also more rapid control of an emergency situation, thus reducing property damage and the risk to life. Persons charged with the protection of a community from fire and emergencies must be able to work with building officials, architects, contractors and engineers on a professional level. For that level of cooperation, essential to the development of safe structures and workable pre-plans, a solid knowledge of building types, structural members, reaction to both man-made and natural stresses and the types of materials used is required. This course is designed to give the student a solid grounding and the background to apply building construction to planning safer responses and to save lives and property.

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Course Objectives

After successfully completing this course, you will be able to

CO-1: Understand why building construction, using proper building construction terminology and preplanning are important for fire ground safety.

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- CO-2:** Identify the variety of forces buildings are subjected to, the different types of loads and how they are applied to buildings, structural members such as columns, beams and walls, and the variety of structural connections and how they behave in a fire.
- CO-3:** Identify and describe basis regulations that apply to building construction projects, the roles of building construction and design teams, the hazards to firefighters during the construction, renovation and demolition of a building, and the different types of materials used in the construction of buildings.
- CO-4:** Explain the history and basis for building codes and the differences between fire and building codes as well as identifying other construction codes and standards and important fire protection features in building codes.
- CO-5:** Understand the basic concepts of fire protection and building construction, the basics of fire behavior, including fire spread, the ways in which smoke and fire containment is achieved and the various types of fire protection systems.
- CO-6:** Identify and describe six types of wood frame structures classified as Type V construction, the differences between balloon frame and platform frame, trusses, fire-stopping and draft-stopping, fire behavior when engineered and manufactured woods are involved and the types of wood siding and roofing materials.
- CO-7:** Identify and describe the differences between mill and heavy timber (Type IV construction), slow-burning, and the hazards of vacant heavy timber buildings and structures under demolition.
- CO-8:** Understand the details of ordinary construction and how fire spreads through void spaces of ordinary construction as well as recognizing collapse indicators and how masonry walls act as fire barriers.
- CO-9:** Understand the differences between noncombustible and fire-resistive construction and identify the different types of steel building components, their characteristics and the hazards associated with each.
- CO-10:** Describe different types of concrete structural systems, the methods of fireproofing steel and ensuring a level fire resistance in concrete as well as how compartmentation works to prevent the spread of fire.
- CO-11:** Explain the unique design and construction details found in buildings based on occupancy type, how occupancy specific building code requirements dictate particular safety features and how occupancy specific affect firefighting operations.
- CO-12:** Explain the various types of collapse, the specific basic competencies all fire fighters should have to perform at a structural collapse and apply risk analysis to fire-ground safety.

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Course Delivery Method

This course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. Online assignments are due by

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Sunday evening of the week as noted and include Forum questions (accomplished in groups through a threaded forum), examination, and individual assignments submitted for review by the Faculty Member). Assigned faculty will support the students throughout this eight-week course.

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Course Resources

Required Course Textbook:

The following book is an e-book and can be found in the Resources folder:

Brannigan, F.L. (2008). *Building Construction for the Fire Service, (4th Ed.)*. Sudbury, MA: Jones and Bartlett Publishers. ISBN 0-7637-4494-8

Additional Readings:

Writing Style Guide: The following guide must be used for all written assignments and can be found in the resources folder.

Publication Manual of the American Psychological Association (6th ed.). Washington, D.C.: American Psychological Association.

Supplemental Readings and Case Studies:

The Supplemental Readings can be found in the Resources Folder.

FA-197 - Guide to Developing Effective Standard Operating Procedures For Fire and EMS Departments, Federal Emergency Management Agency, United States Fire Administration.

TR-004 - Schomberg Plaza Fire, New York City

TR-041 - Nine Elderly Fire Victims in Residential Hotel, Miami Beach, Florida

TR-057 - Chicken Processing Plant Fires Hamlet, North Carolina and North Little Rock, Arkansas

TR-059 - Apartment Complex Fire, 66 Units Destroyed, Seattle, Washington

TR-110 - Manufacturing Mill Fire, Methuen, Massachusetts,

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TR-121 - Kona Village Apartments Fire, Bremerton, Washington

98F-17 - Two Fire Fighters and Four are Hospitalized with Serious Burns in a Five-Alarm Fire, NY

99F-48 - Warehouse Fire Claims the Life of a Battalion Chief – Missouri

F2000-13: Restaurant Fire Claims the Life Of Two Career Fire Fighters, Texas

Web Sites

In addition to the required course texts, the following public domain web sites are useful. Please abide by the university's academic honesty policy when using Internet sources as well. Note web site addresses are subject to change.

Site Name	Web Site URL/Address
National Fire Protection Association	http://www.nfpa.org
National Fire Sprinkler Association	http://www.nfsa.org
National Institute of Occupational Safety and Health (NIOSH)	http://www.cdc.gov/niosh/ http://www.cdc.gov/niosh/fire/
National Institute of Standards and Technology (NIST)	http://www.nist.gov
United States Fire Administration	http://www.usfa.fema.gov/index.shtm

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Evaluation Procedures

Grades for this course will be based upon five grading instruments:

1. Final Project Approval: You must submit your intended topic for your Final Project to the assignment page.
2. Discussion Forums: There are eight discussion questions that are provided in the Discussion Forums which can be found by clicking the Forum link. Each student will post an initial response to the question and respond to at least two other student's posts.
3. Essays: There will be three essays based on the readings from this course.
4. Exams: There will be four exams over the next eight weeks. Each exam will consist of multiple choice and essay style questions.
 - Exam 1: Chapters 1 - 2 - 3

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- Exam 2: Chapters 4 - 5 - 6
- Exam 3: Chapters 7 - 8 - 9
- Exam 4: Chapters 10 - 11 - 12

5. Final Project: A four page report based on an inspection and pre-plan of a building in your area. I have provided all of the necessary information in the Resources folder for this assignment. I have also posted a quick link for this assignment in the Final Project Approval assignment box.

All due dates are found in the Course Outline below.

All graded items for this course will be based on a 100 point grading scale.

Grading Distribution:

Project Approval	- 1%
Discussion Forum	- 32%
Essays	- 21%
Exams	- 36%
<u>Final Project</u>	<u>- 10%</u>
Total	100%

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Course Outline

Please see the [Student Handbook](#) to reference the University's [grading scale](#).

<u>Week</u>	<u>Topic</u>	<u>Learning Objectives</u>	<u>Readings</u>	<u>Assignment</u>
1	Introduction to Building Construction	CO-1	Brannigan: Chapter 1, pp 1-9 FA-197 Guide to Developing Effective Standard Operating Procedures for Fire and EMS Departments: Chapter 1, pp 1-5 Chapter 2, pp 7-18 Chapter 3, pp 19-32	Week 1 - Final Project Approval Week 1 - Forum 1

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2	<p>Concepts of Construction</p> <p>Methods and Materials of Construction, Renovation and Demolition</p>	<p>CO-2</p> <p>CO-3</p>	<p>Brannigan:</p> <p>Chapter 2, pp 10-43</p> <p>Chapter 3 pp 44-63</p> <p>Case Study:</p> <p>TR-059: Apartment Complex Fire, 66 Units Destroyed, Seattle, Washington</p>	<p>Week 2 – Forum 2</p> <p>Exam 1</p>
3	<p>Building and Fire Codes</p>	<p>CO-4</p>	<p>Brannigan:</p> <p>Chapter 4, pp 64-77</p> <p>Case Studies:</p> <p>TR-041: Nine Elderly Fire Victims in Residential Hotel, Miami Beach, Florida</p> <p>TR-110: Manufacturing Mill Fire Methuen, MA</p>	<p>Week 3 – Forum 3</p> <p>Week 3 - Essay 1</p>
4	<p>Features of Fire Protection</p> <p>Wood Frame Construction</p>	<p>CO-5</p> <p>CO-6</p>	<p>Brannigan:</p> <p>Chapter 5, pp 78-127</p> <p>Chapter 6, pp 128-153</p> <p>FA-197 Guide to Developing Effective Standard Operating Procedures for Fire and EMS Departments:</p> <p>Chapter 4, pp 33-48</p> <p>Chapter 5, pp 49-57</p> <p>Chapter 6, pp 59-65</p>	<p>Week 4 – Forum 4</p> <p>Exam 2</p>
5	<p>Heavy Timber and Mill Construction</p>	<p>CO-7</p>	<p>Brannigan:</p> <p>Chapter 7, pp 154-163</p> <p>Case Studies:</p> <p>TR-057: Chicken Processing</p>	<p>Week 5 – Forum 5</p> <p>Essay 2</p>

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			<p>Plant Fires Hamlet, North Carolina and North Little Rock, Arkansas</p> <p>Report F2000-13: Restaurant Fire Claims the Life Of Two Career Fire Fighters, Texas</p>	
6	<p>Ordinary Construction</p> <p>Noncombustible Construction</p>	<p>CO-8</p> <p>CO-9</p>	<p>Brannigan:</p> <p>Chapter 8, pp 164-195</p> <p>Chapter 9, pp 196-221</p> <p>Case Studies:</p> <p>Report 99F-48 – Warehouse Fire Claims the Life of a Battalion Chief – Missouri</p> <p>TR-121: Kona Village Apartments Fire, Bremerton, Washington</p>	<p>Week 6 – Forum 6</p> <p>Exam 3</p>
7	<p>Fire-Resistive Construction</p>	<p>CO-10</p>	<p>Brannigan:</p> <p>Chapter 10, pp 222-249</p> <p>Case Studies:</p> <p>TR-004: Schomberg Plaza Fire, New York City</p> <p>Report 98F-17: Two Fire Fighters and Four are Hospitalized with Serious Burns in a Five-Alarm Fire, New York</p>	<p>Week 7 – Forum 7</p> <p>Essay 3</p>

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8	Specific Occupancy Details and Hazards	CO-11	Brannigan:	Week 8 – Forum 8
	Collapse	CO-12	Chapter 11, pp 250-297	Final Project
			Chapter 12, pp 298-307	Exam 4

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Policies

Please see the [Student Handbook](#) to reference all University policies. Quick links to frequently asked question about policies are listed below.

[Drop/Withdrawal Policy](#)

[Plagiarism Policy](#)

[Extension Process and Policy](#)

[Disability Accommodations](#)

Writing Expectations

Describe your writing expectations.

Citation and Reference Style

Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Late Assignments

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals, I understand you must manage competing demands on your time. Should you need additional time to complete an assignment, please contact me before the due date so we can discuss the situation and determine an acceptable resolution. Routine submission of late assignments is unacceptable and may result in points deducted from your final course grade.

Netiquette

Online universities promote the advancement of knowledge through positive and constructive debate – both inside and outside the classroom. Forums on the Internet, however, can

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occasionally degenerate into needless insults and “flaming.” Such activity and the loss of good manners are not acceptable in a university setting – basic academic rules of good behavior and proper “Netiquette” must persist. Remember that you are in a place for the rewards and excitement of learning which does not include descent to personal attacks or student attempts to stifle the Forum of others.

- **Technology Limitations:** While you should feel free to explore the full-range of creative composition in your formal papers, keep e-mail layouts simple. The Sakai classroom may not fully support MIME or HTML encoded messages, which means that bold face, italics, underlining, and a variety of color-coding or other visual effects will not translate in your e-mail messages.
- **Humor Note:** Despite the best of intentions, jokes and especially satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add “emoticons” to help alert your readers: ;-), :), ☺

Disclaimer Statement

Course content may vary from the outline to meet the needs of this particular group.

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Online Library

The Online Library is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and generally not available through search engines on the open Web. In addition, the Online Library provides access to special learning resources, which the University has contracted to assist with your studies. Questions can be directed to librarian@apus.edu.

- **Charles Town Library and Inter Library Loan:** The University maintains a special library with a limited number of supporting volumes, collection of our professors’ publication, and services to search and borrow research books and articles from other libraries.
- **Electronic Books:** You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.
- **Electronic Journals:** The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- **Tutor.com:** AMU and APU Civilian & Coast Guard students are eligible for 10 free hours of tutoring provided by APUS. [Tutor.com](#) connects you with a professional tutor online 24/7 to provide help with assignments, studying, test prep, resume writing, and more. Tutor.com is tutoring the way it was meant to be. You get expert tutoring whenever you

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need help, and you work one-to-one with your tutor in your online classroom on your specific problem until it is done.

Request a Library Guide for your course (<http://apus.libguides.com/index.php>)

The AMU/APU Library Guides provide access to collections of trusted sites on the Open Web and licensed resources on the Deep Web. The following are specially tailored for academic research at APUS:

- Program Portals contain topical and methodological resources to help launch general research in the degree program. To locate, search by department name, or navigate by school.
- Course Lib-Guides narrow the focus to relevant resources for the corresponding course. To locate, search by class code (e.g., SOCI111), or class name.

If a guide you need is not available yet, please email the APUS Library: librarian@apus.edu.

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Turnitin.com

Turnitin.com is a web-based [plagiarism](#) prevention application licensed, for campus use, through the APUS Online Library. The quick submit option lets faculty upload and check suspicious papers, without requiring student to create their own Turnitin.com profiles.

Turnitin.com analyzes electronic submissions of student writing, compares them to the contents of a huge online database, and generates a customized Originality Report. The database used to produce this analysis contains a massive collection of documents available on the Internet from both free and commercial sources, as well as the full texts of all other papers that have been previously submitted to Turnitin.com.

Similarity index is based on the amount of matching text to a submitted paper:

Blue =	no matching text
Green =	one word to 24% matching
Yellow =	25 -49% matching text
Orange =	50-74% matching text
Red =	75-100% matching text

Selected Bibliography

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Books (for additional reading, research, and information):

The following five books look into many different aspects of fire:

- Cowan, David and John Kuenster; *To Sleep With The Angels*, Ivan, Chicago, 1996, ISBN 1-56663-102-5
- Faith, Nicholas; *Blaze The Forensics of Fire*, St. Marin's Paperbacks, 1999, ISBN 0-31297978-9
- Flynn, Sean; *3000 Degrees, The True Story of a Deadly Fire and the Men Who Fought It*, Warner Books, 2002, ISBN 0-446-52831-5
- Heys, Sam and Allen B. Goodwin; *The Wincoff Fire*, Longstreet Press, Atlanta, 1993, ISBN 1-56352-069-9
- O'Nan, Stewart; *The Arson Fire*, Doubleday, New York, 2000, ISBN 0-385-49684-2

The following two books look into structures from the viewpoint of the architect and engineer. These will give you a closer look at structural types and how the people who build them class structures:

- Levy, Matthys and Mario Salvadori; *Why Buildings Fall Down: How Structures Fail*; W. W. Norton & Company, New York, 1994; ISBN 0-393-31152-x.
- Salvadori, Mario; *Why Buildings Stand Up, The Strength of Architecture*; W. W. Norton & Company, New York, 2002; ISBN 0-393-30676-3.

This last reading is one that has been an important encyclopedic source for fire and life safety and the application of technology to fire and life safety since its first edition in 1896:

- Cote, Arthur E., P.E., Editor-in-Chief; *Fire Protection Handbook* (Various Editions), National Fire Protection Association, Quincy, Massachusetts, (Various Dates); ISBN 0-87765-378-x.

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