

### Building Construction for the Fire Service

Course Title	Building Construction for the Fire Service
Course Number	ATPC2120
Prerequisite (s)	None
Revision Date	June 30, 2018
College Credit Recommendation	This course has a college recommendation of 3 credits, 45 contact hours
Continuing Education Units (CEU's)	45 hours towards Fire Safety Inspector renewal.
Class Days/Time	Online continuing, join anytime
Instructional Supervisor	Ben Rigney (info@jbfires.com)
Class Location	JBfires.com online
Course Description	This course will cover various topics including: identifying hazards from assault by fire and gravity; how building construction can influence fire spread, fire confinement or structural collapse; and other life safety issues. This course identifies construction features and their hazards under fire conditions.
Student Learning Outcomes	<p>After the successful completion of this course, the student will be able to do the following:</p> <ol style="list-style-type: none"> <li>1. Explain the history of building construction and its impact on the fire services including design features and the construction process.</li> <li>2. Discuss the importance of fire resistance and its impact on building construction and classification types.</li> <li>3. Describe various forces and loads placed upon buildings and how these affect structural components and systems.</li> <li>4. Discuss various building systems for moving people and materials, HVAC systems, and smoke control systems and the electrical systems found in buildings and how they relate to firefighting activities.</li> <li>5. Discuss building construction, interior finishes, and fire doors and their effect on fire behavior.</li> <li>6. Describe foundations and considerations when determining the type of foundation to include loads, surface materials, and settlement.</li> <li>7. Explain the considerations when using wood as a building component.</li> <li>8. Explain masonry products and how they are used in buildings.</li> <li>9. Describe properties of steel and where steel is used in building construction.</li> <li>10. Describe the characteristics of concrete and how it is used in buildings structures.</li> <li>11. Describe roof and roof support systems and the materials used</li> </ol>

	<p>to construct them, and the impact on firefighting.</p> <p>12. Discuss special structures such as high rises, underground buildings, membrane structures, correctional facilities, and atriums and the concerns for firefighting and life safety.</p> <p>13. Discuss concerns related to buildings under construction, remodeling, expansion, and demolition.</p> <p>14. Discuss building collapse from forces of nature and building codes that can help minimize the effects of natures.</p>
Required Textbook	Building Construction Related to the Fire Service (4th ed); IFSTA (2016) ISBN: 978-087939594-0
Required Material	Computer with internet access, textbook
Method of Instruction	Online (Must be logged into the course for a minimum of 40 Hours. The other 5 hours will be utilized for offline research.)
Grading	Passing 70%
Certification(s)	One of 4 required courses for Fire Officer 1 classification and One of 5 required courses for Fire Safety Inspector 1 classification
Attendance Policy	Self paced online course to be completed within 1 month. If unable to continue for valid reason, contact instructor for course to be placed on hold or restarted at a later date. No refunds will be given for non completion. All courses completed by the end of the month will receive their final score and certificate by the 15 <sup>th</sup> of the following month.
Academic Integrity	Academic integrity is crucial to the learning community and indicates respect for the college, the instructor, the course, your classmates, and yourself. Any violation of this trust, including but not limited to cheating, plagiarism, collusion, or using or having any content of an unadministered test, will result in immediate dismissal from the course.
Students with Disabilities	Any student who has a permanent or temporary disability that may require a reasonable accommodation to participate in the course must present documentation of the disability and requested accommodation no later than the beginning of the course.
Enabling Objectives	<p>Given information from discussion and reading materials, the student will perform the following objectives to a written test accuracy of at least 70% and meet the applicable job performance requirements of NFPA 1021 (2009) and NFPA 1031 (2014).</p> <p><b>Chapter 1: Building Construction and the Fire Service</b></p> <ol style="list-style-type: none"> <li>1. Recognize how changes in building construction can influence firefighting operations.</li> <li>2. Describe the building design and construction process from concept to renovation and remodeling.</li> </ol>

3. Understand the safety hazards of PPE that are required on a construction site.
4. Identify laws and other regulation variables that affect building design.
5. Identify engineering variables that affect building design.
6. Identify economic variables that affect building design.
7. Identify other variables that affect building design.
8. Identify and describe the various types of licenses required by the state and regulated by DBPR for building construction and the role of such contractors/subcontractors.
9. Understand the licensing requirements of FS 633,471, 481, 489, 468.
10. Understand the building construction requirements under FS 553.
11. Explain fire behavior principles as they apply to community fire defense.
12. Identify factors of structural failure caused by design.
13. Explain the role of preincident planning in building construction
14. Understand how hurricane windows affect ventilation. (FL Objective)
15. Understand the process for Florida inspectors to review permits for construction, renovation, etc. under the Florida Building Code permitting requirements and the FFPC permitting requirements. (FL Objective)
16. Identify Florida rules pertaining to the adoption of the Florida Building Code, and Florida Fire Prevention Code, and NFPA 101. (FL Objective)
17. Describe the Florida Accessibility Code for Building Construction. (FL Objective)
18. Describe the differences in scope and application between the Florida Building Code-Building, Florida Building Code – Residential and the Florida Existing Building Code.
19. Understand how the Florida Building Code core language is based on International Code Council with some modifications.
20. Explain who must conduct building inspections, what certifications must be held, and that the inspection must comply with NFPA 101 as well as witnessing fire system tests. (FL Objective)
21. Identify state requirements for record retention for fire departments. (FL Objective).
22. Describe the building construction and flow requirements for occupancy changes.

**Chapter 2 Building Classifications and Structural Fire Resistance**

1. Describe building classifications used in the fire service.
2. Explain the function of occupancy classifications.
3. Describe ways that fire and fuel load are determined.
4. Explain methods for determining fire resistance.

### **Chapter 3 Structural Design Features of Buildings**

1. Explain various forces, stresses, and loads exerted on the structural design features of a building.
2. Describe common load-bearing structural components.
3. Identify commonly encountered composite structural systems.
4. Identify Florida's criteria for designation as an approved Nationally Recognized Testing Laboratory. (FL Objective)
5. Recognize commonly used internet websites for most NRTL's. (FL Objective)
6. Identify Florida Building Code Section 721 as having procedures to determine fire resistance. (FL Objective)
7. Explain additional residential occupancies. (FL Objective)
8. Describe lightweight truss markings as covered in F.S. 663.222 and FAC 69A-60.0081. Discuss faults of the system as a potentially giving a false safe indicator limitations of the marking system with respect to bar joist, need for preincident planning and fireground assessment regardless of marking system (FL Objective).

### **Chapter 4: Building Systems**

1. Describe the building system functions of stairs.
2. Describe mechanical conveyor systems used in buildings.
3. Describe the building system functions of elevators.
4. Identify types of vertical shafts and utility chases.
5. Explain various functions of building air handling systems.
6. Identify types of electrical equipment used for building systems.
7. Identify Florida Elevator Safety Law as found in F.S. Chapter 399. (FL Objective)
8. Identify the requirement for high rise residential buildings and elevator access according to FS 553.509(2). (FL Objective)
9. Identify NFPA 82 Standard on incinerators and waste and linen handling systems. (FL Objective)
10. Identify NFPA 96 as Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. (FL Objective)
11. Identify Florida requirements for gas stations to have emergency alternate power capability per F.S. 526.143. (FL Objective)

### **Chapter 5 Interior Finishes and Passive Fire Protection**

1. Describe how characteristics of interior finishes influence fire behavior.
2. Describe tests used for interior finishes.
3. Explain how ceilings can influence fire behavior.
4. Identify characteristics of fire walls and partitions.
5. Describe fire doors and how they limit fire damage.

### **Chapter 6: Foundations**

1. Explain how soil properties influence building foundation types.
2. Identify types and components of building foundations.
3. Describe types of foundation walls.
4. Explain the symptoms and causes of building settlement.
5. Recognize uses of shoring and underpinning.

### **Chapter 7: Wood Construction**

1. Describe materials used in wood construction.
2. Recognize combustion properties of wood.
3. Describe ignition-resistant construction.
4. Recognize the importance of calculating structural endurance under fire conditions.
5. Describe various types of wood structural systems.
6. Identify forces that may undermine the structural integrity of wood construction.

### **Chapter 8: Masonry and Ordinary Construction**

1. Describe properties of masonry construction components.
2. Explain how masonry structures are classified in building codes.
3. Describe features and functions of masonry structures.
4. Identify causes of structural failure of masonry construction.

### **Chapter 9: Steel Construction**

1. Describe the material properties of steel.
2. Describe methods used to protect steel construction building elements during a fire.
3. Explain how steel is used in the construction of structural framework.
4. Identify common reasons for collapse of steel structures.

## **Chapter 10: Concrete Construction**

1. Identify material properties of concrete.
2. Differentiate between precast and cast-in-place concrete.
3. Determine factors that affect the finished quality of concrete.
4. Recognize factors that influence fire resistance in concrete construction.
5. Describe types of concrete framing systems.

## **Chapter 11: Roofs**

1. Explain the role roofs play in structural firefighting.
2. Describe major architectural styles of roofs.
3. Identify types of roof support systems.
4. Describe the function of roof decks.
5. Identify materials used to construct roof decks.
6. Distinguish among types of roof coverings.
7. Identify types of green design roofs.
8. Recognize how roof openings can be used in firefighting operations.

## **Chapter 12: Special Structures and Design Features**

1. Describe the characteristics of high-rise buildings and their impact on firefighting tactics.
2. Explain the emergency use of elevators in high-rise buildings during a fire event.
3. Identify characteristics of limited or controlled access buildings.
4. Recognize characteristics of atriums.
5. Describe the characteristics of explosion venting in buildings.
6. Identify the need for areas of refuge within a structure.
7. Identify fire protection hazards that rack storage can create.

## **Chapter 13: Buildings Under Construction, Remodeling, Expansion, and Demolition**

1. Describe conditions at construction sites that impact firefighting tactics.
2. Identify the methods of providing fire protection at construction sites.
3. Explain how structural changes and expansions may affect fire and life safety.
4. Describe demolition hazards as they relate to firefighting tactics.
5. Understand and apply the code provisions of the FFPC and

	<p>NFPA 241 to buildings under construction including FD access and water supply.</p> <p><b>Chapter 14: Non-Fire Building Collapse</b></p> <ol style="list-style-type: none"> <li>1. Describe human-related causes of building collapse.</li> <li>2. Distinguish among nature-related causes of building collapse.</li> <li>3. Explain the importance of preincident planning for wide area incidents.</li> </ol>
Practical Applications	<p>Final project: Choose any commercial building from within your current fire district. You will create a one-page document with the following information:</p> <ol style="list-style-type: none"> <li>1. Picture of building</li> <li>2. Type of construction</li> <li>3. Occupancy</li> <li>4. Hazard levels (high, medium, low) &amp; why</li> <li>5. Life safety levels (high, medium, low) &amp; why</li> <li>6. Fire protection system</li> <li>7. Foreseeable problems</li> <li>8. What ifs based on your work position</li> </ol> <p>(If you are not presently working within a fire district, choose a building in your community.)</p>
Class Participation	<p>Your class participation grade will consist of 1 discussion post along with 2 responses to your classmates for each lesson. The recommended word count is 100 words for your initial post and 20 words for each response. Your class participation grade will be based on the quality of your discussion posts. If you have any questions regarding your Class Participation grade do not hesitate to reach out to the instructor.</p>
Grading Scale	<p>Quizzes 20%</p> <p>Class participation 20%</p> <p>Course project 20%</p> <p>Midterm exam 20%</p> <p>Final exam 20%</p>