Building Construction for the Fire Service

Title: Master Syllabus
Date: October 19, 2016

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Building Construction for the Fire Service</th>
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<tbody>
<tr>
<td>Course Number</td>
<td>FFP2120, BFST2120, and ATCP2120</td>
</tr>
<tr>
<td>Prerequisite(s)</td>
<td>None</td>
</tr>
<tr>
<td>Revision Date</td>
<td>October 19, 2016</td>
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<thead>
<tr>
<th>College Credit Recommendation</th>
<th>This course has a college recommendation of 3 credits.</th>
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<tbody>
<tr>
<td>Continuing Education Units (CEU’s)</td>
<td>40 hours towards Fire Safety Inspector renewal.</td>
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<tr>
<td>Class Days/Time</td>
<td>Monday – Friday 8:00 a.m. – 5:00 p.m.</td>
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| Instructional Supervisor | Name: Dr. Barbara Klingensmith  
|                         | Email: Barbara.Klingensmith@myfloridacfo.com |
| Program Manager         | Name: Michael R. Swartz  
|                         | Email: Mike.swartz@myfloridacfo.com |
| Class Location          | Room 107 |

<table>
<thead>
<tr>
<th>Course Description</th>
<th>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.</th>
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| Student Learning Outcomes | After the successful completion of this course, the student will be able to do the following:  
|--------------------------|---------------------------------------------------------------------------------------------|
|                         | 1. Explain the history of building construction and its impact on the fire services including design features and the construction process.  
|                         | 2. Discuss the importance of fire resistance and its impact on building construction and classification types. |
|                         | 3. Describe various forces and loads placed upon buildings and how these affect structural components and systems.  
|                         | 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.  
|                         | 5. Discuss building construction, interior finishes, and fire doors and their effect on fire behavior.  
|                         | 6. Describe foundations and considerations when determining the type of foundation to include loads, surface materials, and settlement. |
7. Explain the considerations when using wood as a building component.
8. Explain masonry products and how they are used in buildings.
9. Describe properties of steel and where steel is used in building construction.
10. Describe the characteristics of concrete and how it is used in building structures.
11. Describe roofs and roof support systems and the materials used to construct them, and the impact on firefighting.
12. Discuss special structures such as high rises, underground buildings, membrane structures, correctional facilities, and atriums and the concerns for firefighting and life safety.
13. Discuss concerns related to buildings under construction, remodeling, expansion, and demolition.
14. Discuss building collapse from forces of nature and building codes that can help minimize the effects of nature.

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<tr>
<td><strong>Required Materials</strong></td>
<td>None.</td>
</tr>
<tr>
<td><strong>Method of Instruction</strong></td>
<td>Classroom</td>
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<tr>
<td><strong>Grading</strong></td>
<td>Passing 70% (Quizzes 30%   Final 50%   Presentations 20%)</td>
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| **Certification(s)** | One of five required courses for Fire Officer I certification
 | FFP2120, BFST2120, OR ATPC2120
 | FFP2720 or BFST2720 or ATPC2720
 | RN4807
 | FFP1740 or BFST1740 or ATPC1740
 | FFP1810 or BFST1810 or ATPC1810

   BUILDING CONSTRUCTION FOR THE FIRE SERVICE
   COMPANY OFFICER
   COURAGE TO BE SAFE
   FIRE SERVICE COURSE DELIVERY
   FIREFIGHTING TACTICS AND STRATEGIES I

   One of the five required courses for Firesafety Inspector I certification
   FFP1510, BFST1510, or ATPC1510
   FFP2120, BFST2120, or ATPC1510
   FFP2521, BFST2521 or ATPC2521

   CODES AND STANDARDS
   BUILDING CONSTRUCTION FOR THE FIRE SERVICE
   CONSTRUCTION DOCUMENTS AND PLANS REVIEW
### Attendance Policy
You are required to attend all sessions of the course and complete all pre-course assignments. Failure to appear in class for a scheduled activity will be considered an absence. Students are allowed to miss 10% of the class and still receive credit. There are no makeup sessions.

### 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 un-administered test, will result in immediate dismissal from the course. Under Florida Statute 633, any student dismissed for academic dishonesty can be refused acceptance for any course administered by FSFC.

### 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.

### Emergency Evacuation Policy
Occupants of buildings on the Florida State Fire College campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation.

- Familiarize yourself with all exit doors of the classroom and the building.
- Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform the instructor on the first day of class.
- In the event of an evacuation, follow the guidance of the instructor.
- Do not re-enter a building unless you are given instructions by Florida State Fire College personnel to do so.

### Requesting Emergency Care
Any request for emergency care should be initiated by calling “911” from any phone on campus of the Florida State Fire College. Phones are located in each classroom. Additionally, in the event of any emergency, immediately contact an instructor or staff member.

### Critical Event Procedures
**Severe Weather** – there is a lightning detection system on campus which has an audible 15 second blast of an air horn. If you are outside, please follow your instructor or move to the closest permanent building. Once the threat is over, there will be three 5 second blasts of the signal.

**Security** – During the daytime, security is handled by full time faculty and staff. There are security guards on duty in the evenings and weekends. Please comply with the requests made of security officers. Failure to do so can result
in removal from campus.

**Student Badges** – You will be issued a badge to be worn anytime you are on campus.

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<th>Enabling Objectives</th>
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<td>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 (2009).</td>
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**Chapter 1: Building Construction and the Fire Service**

1. Recognize how changes in building construction can influence firefighting operations.
2. Describe the building design and construction process from concept to renovation and remodeling.
3. Identify laws and other regulation variables that affect building design.
4. Identify engineering variables that affect building design.
5. Identify economic variables that affect building design.
6. Identify other variables that affect building design.
7. Explain fire behavior principles as they apply to community fire defense.
8. Identify factors of structural failure caused by design.
9. Explain the role of preincident planning in building construction.
10. Understand how hurricane windows affect ventilation. (FL Objective)
11. Understand the process for Florida inspectors to review permits for construction, renovation, etc. (FL Objective)
12. Identify Florida rules pertaining to the adoption of the Florida Building Code, Florida Fire Prevention Code, and NFPA 101. (FL Objective)
13. Describe the Florida Accessibility Code for Building Construction. (FL Objective)
14. 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)
15. Identify state requirements for record retention for fire departments. (FL Objective)
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 NTRL’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. (FL Objective)

Chapter 4 Building Systems

1. Explain the various loads exerted on a building resulting from environmental sources.
2. Distinguish between the classifications of loads based on origin and movement.
3. Recognize and discuss the internal forces resulting from the loads and forces applied to a structural member.
4. Describe the basic structural components.
5. Describe the basic structural systems.

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)
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 fire fighting.
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.

### Chapter 14: Non-Fire Building Collapse

1. Describe human-related causes of building collapse.
2. Distinguish among nature-related causes of building collapse.
3. Explain the importance of preincident planning for wide area incidents.

### NFPA 1031

**FESHE Building Construction for Fire Protection Outcomes**

1. Describe building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, firefighting strategy, and tactics.
2. Classify major types of building construction in accordance with a local/model building code.
3. Analyze the hazards and tactical considerations associated with the various types of building construction.
4. Explain the different loads and stresses that are placed on a building and
their interrelationships.

5. Identify the function of each principle structural component in typical building design.

6. Differentiate between fire resistance, flame spread, and describe the testing procedures used to establish ratings for each.

7. Classify occupancy designations of the building code.

8. Identify the indicators of potential structural failure as they relate to firefighter safety.

9. Identify the role of GIS as it relates to building construction.