

Building Construction for Firefighters

Course Design

2002-2003

Course Information

Organization:	EASTERN ARIZONA COLLEGE
Division:	ITE
Course Number:	FSC 175
Title:	Building Construction for Firefighters
Credits:	3
Developed by:	Dr. Barbara Ganz
Lecture/Lab Ratio:	3 Lec/0 Lab
Transfer Status:	Transferable to ASU East - BAS; nontransferable to UofA & NAU
Extended Registration	
Class:	No
CIP Code:	43.0203
Assessment Mode:	Pre/Post test with a total of 10 possible points
Semester Taught:	Offered upon request.
Gen. Ed. Area:	None
Separate Lab:	No
Awareness Course:	No
Intensive Writing	
Course:	No
Prerequisites:	1. None
Educational Value:	This course is designed for company fire officers and other fire department personnel.
Goals:	1. This course is designed to improve firefighter safety during fire situations in relation to building construction and effects of fire on a variety of construction types. All firefighters will be able to assume a role of safety officer for personal protection in relation to building construction.
Description:	This course is designed to improve firefighter safety on the fire ground. This course will demonstrate the effects that fire and heat may have on various types of building construction and the resulting loss of structural integrity. It also includes information on the signs and symptoms of structural damage.
Textbooks:	Building Construction for the Fire Service 3rd Ed.
Supplies:	None

Competencies and Performance Standards

1. Explain the local and federal codes in relation to building construction.			
<i>Domain--Cognitive</i>	<i>Level--Evaluation</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
<p>Criteria--Performance will be satisfactory when:</p> <ul style="list-style-type: none"> • learner will describe how local codes apply to building construction. • learner will describe how federal codes apply to building construction. • learner will identify the functions of standards-setting organizations such as the American National Standards Institute. 	<p>Conditions--Competence will be demonstrated:</p> <ul style="list-style-type: none"> • by written tests. 	<p>Learning Objectives:</p> <ol style="list-style-type: none"> Describe how local codes apply to building construction. Describe how federal codes apply to building construction. Identify the functions of standards-setting organizations such as the American National Standards Institute. 	
2. Discuss how the principles of construction relate to fire fighting.			
<i>Domain--Cognitive</i>	<i>Level--Evaluation</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
<p>Criteria--Performance will be satisfactory when:</p> <ul style="list-style-type: none"> • learner will identify the standard types of building construction. • learner will discuss how fire affects the strength of common building materials. • learner will define various types of loads. • learner will explain how a column, wall, arch, or beam supports a load. 	<p>Conditions--Competence will be demonstrated:</p> <ul style="list-style-type: none"> • by written tests. 	<p>Learning Objectives:</p> <ol style="list-style-type: none"> Identify the standard types of building construction. Discuss how fire affects the strength of common building materials. Define various types of loads. Explain how a column, wall, arch, or beam supports a load. 	
3. Discuss how the principles of wood construction relate to fire fighting.			
<i>Domain--Cognitive</i>	<i>Level--Evaluation</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
<p>Criteria--Performance will be satisfactory when:</p> <ul style="list-style-type: none"> • learner will explain how wood construction differs from other common building materials. • learner will explain how wooden post and frame construction react to fire. • learner will discuss plank and beam construction and how this method of construction reacts to fire. • learner will identify indicators of collapse in wood frame structures. 	<p>Conditions--Competence will be demonstrated:</p> <ul style="list-style-type: none"> • by written tests. 	<p>Learning Objectives:</p> <ol style="list-style-type: none"> Explain how wood construction differs from other common building materials. Explain how wooden post and frame construction react to fire. Discuss plank and beam construction and how this method of construction reacts to fire. Identify indicators of collapse in wood frame structures. 	

4. Discuss the principles of ordinary construction (masonry).			
<i>Domain--Cognitive</i>	<i>Level--Evaluation</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner will explain ordinary masonry construction principles. • learner will identify potential hazards to fire fighter safety in ordinary construction. • learner will identify indicators of collapse in ordinary construction. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Explain ordinary masonry construction principles. Identify potential hazards to fire fighter safety in ordinary construction. Identify indicators of collapse in ordinary construction. 	
5. Explain the hazards associated with multiple dwelling apartment complexes.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner will define multiple dwelling apartment complexes. • learner will discuss the fire hazards associated with fire fighting in this type of dwelling. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Define multiple dwelling apartment complexes. Discuss the fire hazards associated with fire fighting in this type of dwelling. 	
6. Discuss the principles of fire resistance construction.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner will explain the standards used in fire resistant construction. • learner will compare and contrast fire resistant construction to other construction methods. • learner will identify key features of non-combustible and/or fire-resistive buildings and how they affect emergency operations. • learner will identify the functions of nationally recognized products testing agencies such as Underwriters Laboratories. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Explain the standards used in fire resistant construction. Compare and contrast fire resistant construction to other construction methods. Identify key features of non-combustible and/or fire-resistive buildings and how they affect emergency operations. Identify the functions of nationally recognized products testing agencies such as Underwriters Laboratories. 	

7. Discuss the principles of steel construction.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner will explain the principles of steel construction. • learner will discuss how steel construction reacts to fire. • learner will discuss how steel can be used to increase or decrease a structure's resistance to stress and fire. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Explain the principles of steel construction. Discuss how steel construction reacts to fire. Discuss how steel can be used to increase or decrease a structure's resistance to stress and fire. 	
8. Discuss the principles of concrete construction.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner can describe how concrete can be used to increase or decrease a structure's resistance to stress and fire. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Describe how concrete can be used to increase or decrease a structure's resistance to stress and fire. 	
9. Explain flame spread, smoke and fire containment in relation to all types of building construction.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Essential</i>	<i>Difficulty--High</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner can discuss how flames spread in relation to all types of building construction. • learner can explain how smoke spreads in relation to all types of building construction. • learner can explain fire containment in all types of building construction. • learner can explain venting. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Discuss how flames spread in relation to all types of building construction. Explain how smoke spreads in relation to all types of building construction. Explain fire containment in all types of building construction. Explain venting. 	
10. The student will be able to discuss how the construction of high-rise buildings affects fire fighting.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Important</i>	<i>Difficulty--Medium</i>
Criteria-- Performance will be satisfactory when: <ul style="list-style-type: none"> • learner can identify fire problems associated with high-rise structures. • learner can describe how fire operations are affected. 	Conditions-- Competence will be demonstrated: <ul style="list-style-type: none"> • by written tests. 	Learning Objectives: <ol style="list-style-type: none"> Identify fire problems associated with high-rise structures. Describe how fire operations are affected. 	

11.The student will be able to define the fire and egress safety procedures used in building construction.			
<i>Domain--Cognitive</i>	<i>Level--Analysis</i>	<i>Importance--Essential</i>	<i>Difficulty--High</i>
<p>Criteria--Performance will be satisfactory when:</p> <ul style="list-style-type: none"> • Determine where and what types of fire doors are required for the different areas in various occupancies. • Describe conditions which require that special fire reacted building components such as fire stops, draft curtains, smoke vents, rated ceilings must be installed. • learner can describe the relationships between building interior design and fire department operations. • learner can describe the effects of various factors such as automatic suppression, handicap barriers, smoke movement, people protection and so on would have in fire conditions on building safety. • learner can define what a truss is and identify problems associated with them. • learner can explain how a truss can be affected by fire and how that can affect fire apartment operations. • learner can describe where to specify closed stairs, smoke-proof towers, or other methods of egress. 	<p>Conditions--Competence will be demonstrated:</p> <ul style="list-style-type: none"> • by written tests. 	<p>Learning Objectives:</p> <ol style="list-style-type: none"> a. Determine where and what types of fire doors are required for the different areas in various occupancies. b. Describe conditions which require that special fire reacted building components such as fire stops, draft curtains, smoke vents, rated ceilings must be installed. c. Describe the relationships between building interior design and fire department operations. d. Describe the effects of various factors such as automatic suppression, handicap barriers, smoke movement, people protection and so on would have in fire conditions on building safety. e. Define what a truss is and identify problems associated with them. f. Explain how a truss can be affected by fire and how that can affect fire apartment operations. g. Describe where to specify closed stairs, smoke-proof towers, or other methods of egress. 	

Types of Instruction

Classroom Presentation

Grading Policy

Evaluation Methods: Post test = 10% of the Final Grade. Students who do not take the Post-Test will have their grade dropped by one letter.

Grading Scale:

Grade	Requirement
A	100-90%
B	89-80%
C	79-70%
D	69-60%
F	Below 60%

Learning Plans

Learning Plan 1-- Learning Plan 1

Overview: The student will be able to explain the local and federal codes as they relate to building construction.

Competency: 1. **Explain the local and federal codes in relation to building construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 2-- Learning Plan 2

Overview: The student will be able to discuss the principle of construction.

Competency: 2. **Discuss how the principles of construction relate to fire fighting.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 3-- Learning Plan 3

Overview: The student will be able to describe the principles of wood construction.

Competency: 3. **Discuss how the principles of wood construction relate to fire fighting.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance**Assessment Activities:**

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 4-- Learning Plan 4

Overview: The student will be able to discuss the principles of ordinary construction (masonry).

Competency: 4. **Discuss the principles of ordinary construction (masonry).**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance**Assessment Activities:**

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 5-- Learning Plan 5

Overview: The student will be able to explain the hazards associated with multiple dwelling apartment complexes.

Competency: 5. **Explain the hazards associated with multiple dwelling apartment complexes.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 6-- Learning Plan 6

Overview: The student will be able to discuss the principles of fire resistant construction.

Competency: 6. **Discuss the principles of fire resistance construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 7-- Learning Plan 7

Overview: The student will be able to discuss the principles of steel construction as it relates to fire fighting.

Competency: 7. **Discuss the principles of steel construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance**Assessment Activities:**

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 8-- Learning Plan 8

Overview: The student will be able to discuss the principles of concrete construction in regards to fire fighting.

Competency: 8. **Discuss the principles of concrete construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance**Assessment Activities:**

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan 9-- Learning Plan 9

Overview: The student will be able to explain flame spread, smoke and fire containment in relation to all types of building construction.

Competency: 9. **Explain flame spread, smoke and fire containment in relation to all types of building construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan Learning Plan 10

Overview: The student will be able discuss how to the construction of high-rise buildings effects fire fighting.

Competency: 10. **The student will be able discuss how to the construction of high-rise buildings effects fire fighting.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance Assessment Activities:

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.

Learning Plan Learning Plan 11

Overview: The student will be able to define the fire and egress safety procedures used in building construction.

Competency: **11. The student will be able to define the fire and egress safety procedures used in building construction.**

Learning Activities:

- _____ 1. READ and study assignments.
- _____ 2. ASK/ANSWER questions about procedures and techniques.
- _____ 3. OBSERVE instructor demonstrations.
- _____ 4. DISCUSS concepts, ideas, and issues with classmates.

Performance**Assessment Activities:**

- _____ 1. Complete homework assignments.
- _____ 2. Complete quiz.
- _____ 3. Participate in class.