

**Western Technical College**

**10503157 Fire Investigation**

**Course Outcome Summary**

**Course Information**

<b>Description</b>	Provides learners with the fundamentals and technical knowledge needed for proper fire scene investigations.
<b>Career Cluster</b>	Law, Public Safety, Corrections and Security
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	3
<b>Total Hours</b>	54

**Textbooks**

*Fire Investigator*. 5th Edition. Copyright 2019. International Association of Arson Investigators. Publisher: Jones & Bartlett Publishers. **ISBN-13:** 978-1-284-14074-3. Required.

**Learner Supplies**

Polo shirt with logo, black pants, black ankle supporting shoes/boots. **Vendor:** To be discussed in class. Required.

**Success Abilities**

1. Apply mathematical concepts.
2. Demonstrate ability to think critically.
3. Demonstrate ability to value self and work ethically with others in a diverse population.
4. Make decisions that incorporate the importance of sustainability.
5. Transfer social and natural science theories into practical applications.
6. Use effective communication skills.
7. Use technology effectively.

**Program Outcomes**

1. Demonstrate professional conduct by displaying personal code of ethics, positive work ethics, flexibility, teamwork skills, physical fitness, safe procedures, and sensitivity to diverse cultures and individuals
2. Perform fire prevention activities including preplanning, public education, inspection, and investigation

3. Apply incident management and mitigation skills to emergency incidents
4. Meet professional fire and EMS credentialing standards
5. Communicate clearly and effectively both verbally and through written documentation with clients, coworkers, other agencies, and supervisors
6. Apply critical thinking skills to both emergency and non-emergency situations.

## **Course Competencies**

### **1. Identify the responsibilities of a firefighter when responding to the scene of a fire, including scene security and evidence preservation.**

#### **Assessment Strategies**

- 1.1. Written Objective Test
- 1.2. Scenario Response

#### **Criteria**

*Performance will be satisfactory when:*

- 1.1. Complete exam within 90 minutes.
- 1.2. Complete exam without using any reference books or notes.
- 1.3. Complete exam at prescribed time and place.
- 1.4. Participate in investigation scenario.
- 1.5. Develop hypothesis for fire cause.
- 1.6. Justify your cause hypothesis.
- 1.7. Discuss evidence and indicators visible in fire cause scenario.

#### **Learning Objectives**

- 1.a. Analyze the roles and responsibilities of emergency response personnel when investigation fires.
- 1.b. Analyze the roles of other entities involved in fire and explosion investigations.
- 1.c. Explain legal considerations during a fire investigation.

### **2. Critique the implications of constitutional amendments as they apply to fire investigations.**

#### **Assessment Strategies**

- 2.1. Written Objective Test
- 2.2. Scenario Response

#### **Criteria**

*Performance will be satisfactory when:*

- 2.1. Complete exam within 90 minutes.
- 2.2. Complete exam without using any reference books or notes.
- 2.3. Complete exam at prescribed time and place.
- 2.4. Participate in investigation scenario.
- 2.5. Develop hypothesis for fire cause.
- 2.6. Justify your cause hypothesis.
- 2.7. Discuss evidence and indicators visible in fire cause scenario.

#### **Learning Objectives**

- 2.a. Evaluate legal considerations for fire and explosion investigations.
- 2.b. Discuss arson, its forms and its legal repercussions.
- 2.c. Identify fire-related criminal acts.
- 2.d. Critique the role of civil litigation in fire investigation cases.

### **3. Identify key case law decisions that have affected fire investigations.**

#### **Assessment Strategies**

- 3.1. Written Objective Test
- 3.2. Scenario Response

#### **Criteria**

*Performance will be satisfactory when:*

- 3.1. Complete exam within 90 minutes.
- 3.2. Complete exam without using any reference books or notes.
- 3.3. Complete exam at prescribed time and place.
- 3.4. Participate in investigation scenario.
- 3.5. Develop hypothesis for fire cause.
- 3.6. Justify your cause hypothesis.
- 3.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 3.a. Explain the means and methods for obtaining the right to enter a scene.
- 3.b. Summarize Michigan vs. Clifford.
- 3.c. Summarize Michigan vs. Tyler.

**4. Examine the common terms used in fire investigations.**

**Assessment Strategies**

- 4.1. Written Objective Test
- 4.2. Scenario Response

**Criteria**

*Performance will be satisfactory when:*

- 4.1. Complete exam within 90 minutes.
- 4.2. Complete exam without using any reference books or notes.
- 4.3. Complete exam at prescribed time and place.
- 4.4. Participate in investigation scenario.
- 4.5. Develop hypothesis for fire cause.
- 4.6. Justify your cause hypothesis.
- 4.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 4.a. Identify the common job performance requirements for the field of fire investigation.
- 4.b. Recognize the necessary investigative information to be identified, collected, and preserved during fire suppression.
- 4.c. Summarize definitions of various terms used in fire investigations.

**5. Explain the basic elements of fire dynamics and how they affect cause determination.**

**Assessment Strategies**

- 5.1. Written Objective Test
- 5.2. Scenario Response

**Criteria**

*Performance will be satisfactory when:*

- 5.1. Complete exam within 90 minutes.
- 5.2. Complete exam without using any reference books or notes.
- 5.3. Complete exam at prescribed time and place.
- 5.4. Participate in investigation scenario.
- 5.5. Develop hypothesis for fire cause.
- 5.6. Justify your cause hypothesis.
- 5.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 5.a. Describe the four conditions that must exist for a fire to occur.
- 5.b. Recognize the details involved in the typical flaming combustion of organic fuels.
- 5.c. Describe several states of combustion.
- 5.d. Explain the three basic methods of heat transfer.
- 5.e. Discuss the four phases of fire development.

**6. Compare the types of building construction on fire progression.**

**Assessment Strategies**

- 6.1. Written Objective Test
- 6.2. Scenario Response

#### **Criteria**

- 6.1. Complete exam within 90 minutes.
- 6.2. Complete exam without using any reference books or notes.
- 6.3. Complete exam at prescribed time and place.
- 6.4. Participate in investigation scenario.
- 6.5. Develop hypothesis for fire cause.
- 6.6. Justify your cause hypothesis.
- 6.7. Discuss evidence and indicators visible in fire cause scenario.

#### **Learning Objectives**

- 6.a. Explain fire resistance.
- 6.b. Compare different types of building materials and the effects of fire upon them.
- 6.c. Evaluate the NFPA 220 construction type classifications.
- 6.d. Identify construction details of mobile homes, prefabricated buildings, modular buildings, geodesic structures, and log homes.
- 6.e. Explain the role of building components during fire investigation.
- 6.f. Explain compartmentalization affects fire spread.

### **7. Analyze how fire progression is affected by fire protection systems and building design.**

#### **Assessment Strategies**

- 7.1. Written Objective Test
- 7.2. Scenario Response

#### **Criteria**

*Performance will be satisfactory when:*

- 7.1. Complete exam within 90 minutes.
- 7.2. Complete exam without using any reference books or notes.
- 7.3. Complete exam at prescribed time and place.
- 7.4. Participate in investigation scenario.
- 7.5. Develop hypothesis for fire cause.
- 7.6. Justify your cause hypothesis.
- 7.7. Discuss evidence and indicators visible in fire cause scenario.

#### **Learning Objectives**

- 7.a. Explain the way in which a buildings interior finish relates to a fire.
- 7.b. Explain the relevance of environmental systems to fire investigations.
- 7.c. Discuss building fire suppression systems and their effects on fire progression.
- 7.d. Describe specialized systems that may effect fire investigation.

### **8. Explore the basic principles of electricity as an ignition source.**

#### **Assessment Strategies**

- 8.1. Written Objective Test
- 8.2. Scenario Response

#### **Criteria**

*Performance will be satisfactory when:*

- 8.1. Complete exam within 90 minutes.
- 8.2. Complete exam without using any reference books or notes.
- 8.3. Complete exam at prescribed time and place.
- 8.4. Participate in investigation scenario.
- 8.5. Develop hypothesis for fire cause.
- 8.6. Justify your cause hypothesis.
- 8.7. Discuss evidence and indicators visible in fire cause scenario.

#### **Learning Objectives**

- 8.a. Identify the most common causes of residential electrical fires.
- 8.b. describe the investigative methodology for identifying ignition of fires by electrical means.
- 8.c. Explain how to identify wiring systems, current carrying capacity, and over current protection.

- 8.d. Understand the concepts of arc-fault mapping.
- 8.e. Explain several techniques used to investigate electricity related fires.

**9. Summarize potential health and safety hazards.**

**Assessment Strategies**

- 9.1. Written Objective Test
- 9.2. Scenario Response

**Criteria**

- 9.1. Complete exam within 90 minutes.
- 9.2. Complete exam without using any reference books or notes.
- 9.3. Complete exam at prescribed time and place.
- 9.4. Participate in investigation scenario.
- 9.5. Develop hypothesis for fire cause.
- 9.6. Justify your cause hypothesis.
- 9.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 9.a. Discuss the fire investigators responsibilities for safety at a fire scene.
- 9.b. Explain how to conduct a hazard risk assessment.
- 9.c. Explain safety clothing and equipment to be used at fire and explosion sites.
- 9.d. Discuss the role of personal health and safety for the fire investigator.
- 9.e. Discuss safety concerns with materials after they have left the scene.

**10. Summarize the process of conducting investigations using the scientific method.**

**Assessment Strategies**

- 10.1. Written Objective Test
- 10.2. Scenario Response

**Criteria**

- 10.1. Complete exam within 90 minutes.
- 10.2. Complete exam without using any reference books or notes.
- 10.3. Complete exam at prescribed time and place.
- 10.4. Participate in investigation scenario.
- 10.5. Develop hypothesis for fire cause.
- 10.6. Justify your cause hypothesis.
- 10.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 10.a. Summarize the importance of a systematic approach to fire investigation.
- 10.b. Describe the application of the scientific method in the fire investigative process.
- 10.c. Summarize the requirements for expert testimony, scientific method, and exhibits.

**11. Identify cause and origin of fire.**

**Assessment Strategies**

- 11.1. Written Objective Test
- 11.2. Scenario Response

**Criteria**

- 11.1. Complete exam within 90 minutes.
- 11.2. Complete exam without using any reference books or notes.
- 11.3. Complete exam at prescribed time and place.
- 11.4. Participate in investigation scenario.
- 11.5. Develop hypothesis for fire cause.
- 11.6. Justify your cause hypothesis.
- 11.7. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 11.a. Perform a fire investigation for a given scenario.
- 11.b. Find the origin of a fire.
- 11.c. Identify the likely cause of a fire.
- 11.d. Photograph evidence used to determine cause and origin of fire.

**12. Identify the characteristics of an incendiary fire and common motives of the fire setter.**

**Assessment Strategies**

- 12.1. Written Objective Test
- 12.2. Scenario Response

**Criteria**

*Performance will be satisfactory when:*

- 12.1. Score a minimum of 70%.
- 12.2. Complete exam within 90 minutes.
- 12.3. Complete exam without using any reference books or notes.
- 12.4. Complete exam at prescribed time and place.
- 12.5. Participate in investigation scenario.
- 12.6. Develop hypothesis for fire cause.
- 12.7. Justify your cause hypothesis.
- 12.8. Discuss evidence and indicators visible in fire cause scenario.

**Learning Objectives**

- 12.a. Explain how to determine the area of origin.
- 12.b. Explain the basic physics behind fire-pattern generation.
- 12.c. Explain fire pattern analysis.
- 12.d. Explain depth of char analysis.
- 12.e. Identify indicators of an incendiary fire.
- 12.f. Examine potential motives of adult fire setters.
- 12.g. Describe evidence that might indicate an individual had the opportunity to commit the crime.