

COCONINO COMMUNITY COLLEGE

COURSE OUTLINE

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Status: Permanent

Date: December 4, 1991

A. Identification:

1. Subject Area: Fire Science
2. Course Number: FSC 234
3. Course Title: FIRE INVESTIGATION
4. Credit Hrs: 3
5. Catalog Description:

Methods of determining point of fire origin and fire cause, and detection of incendiary fires. Includes simplified physics and chemistry necessary to analyze fire behavior. Three lecture.

B. Course Goals:

To provide the students with the necessary skills to understand the importance of the investigation process and to assist a fire investigation on the fire ground.

C. Course Outcomes:

Students will:

1. Identify the main elements determining fire behavior.
2. Recognize the proper methods of investigating and documenting a structural fire.
3. Recognize laboratory services available to assist the fire investigator.
4. Develop the mental processes of fire and arson analysis.

AND

1. Describe the main elements that determine fire behavior.
2. Define the methods of heat transfer.
3. Describe the classification of building construction.
4. Describe the elements of construction most important to a fire investigator.
5. Identify the relationship between point of origin and fire cause.
6. Cite the primary cause of accidental fires.
7. Cite the primary motivator of fire-setters.
8. Describe the methods of photography and sketching commonly used by fire investigators.
9. Describe the proper methods of investigating and documenting a structural fire.
10. Describe the primary legal aspects of fire investigation.
11. Know the laboratory services available to assist the fire investigator.
12. Know the mental processes of fire and arson analysis.

D. Course Content:

Will include:

1. The Fire Problem
2. Elementary chemistry of Combustion
3. Nature and Behavior of Fire
 - a. Elements of combustion
 - b. Explosive combustion
 - c. Heat
 - d. Sequence of a fire
 - e. Effects of environmental conditions
4. Combustion Properties of Liquid and Gaseous Fuels
 - a. Types of fuel
 - b. Physical properties of fuel
 - c. Hydrocarbon fuels

- d. Pyrolysis and decomposition of liquids
- 5. Combustion Properties of Solid Fuels
 - a. Wood, paper, plastics, paint, metals
 - b. Fire behavior
- 6. Sources of Ignition
 - a. Primary igniters
 - b. Services and appliances starting fires
 - c. Burning fragments in kindling fire
 - d. Mechanical sparks
 - e. Smoking as an origin
- 7. Structure Fires and Investigation
 - a. Elements of building construction
 - b. Principles of fire behavior
 - c. Investigating information during suppression
 - d. Fire scene examination
- 8. Grass and Wildland Fires
 - a. Fuels
 - b. Behavior
 - c. Determination of origin
 - d. Ignition sources
- 9. Automobile and Ship Fires
 - a. Vehicle examination
 - b. Motor homes and vacation trailers
- 10. Electrical Causes of Fire
 - a. Basic electricity
 - b. Wiring systems
 - c. Electrical ignition
- 11. Clothing and Fabric Fires
 - a. Cloth types
 - b. Hazards
 - c. Mattress and upholstered furniture
 - d. Flammability testing
- 12. Explosions and Explosive combustion
 - a. Diffuse - phase explosions
 - b. Dense - phase explosions
 - c. Diagnostic signs
- 13. Chemical Fires and Hazardous Materials
 - a. Gases
 - b. Liquids
 - c. Solids
 - d. Clandestine drug labs
- 14. Laboratory Services
 - a. General fire evidence
 - b. Identification of volatile accelerant
 - c. Chemical incendiaries
- 15. Fire Related Deaths
 - a. Team effort
 - b. Pathological and toxicological examination
- 16. Arson as a Crime
 - a. Motives
 - b. The arson set
 - c. Deductions from interpretation of evidence
- 17. Other Investigative Topics
 - a. Arson law
 - b. Elements of proof

- c. Sources of information
- d. Chain of evidence
- e. Report writing
- f. Courtroom testimony