

Lassen Community College Course Outline

FS 97A: Fire Control 4A, Ignitable Liquids and Gases Awareness/Operations 0.5 units

I. Catalog Description

This course provides the knowledge and skills that prepare a firefighter to extinguish an ignitable liquid fire and control a flammable gas fire. Subjects include fire behavior, safety, control methods, extinguishing agents, foam operations and water flow requirements. A supplemental \$81.00 fee will be charged including a \$5.00 materials fee for student manual flash drive and a \$76.00 State Fire Training FSTEP certification fee is due to Lassen Community College and will be collected at the time of registration. Full Structural PPE is required including SCBA's (can be provided by the college if needed). Instructor approval is required for the course.

Recommended Preparation: Successful completion of ENGL 105 or equivalent multiple measures placement.

Pre-Requisite(s):-SFT Firefighter 1 training in safety, structural fire suppression, and communications **or** 2 years' experience as a volunteer firefighter.

AND

FS-72 HazMat First Responder Operations or equivalent through SFT or CSTI – First Responder Hazmat Operational (FRO) or FS-72C Haz Mat Awareness or equivalent

Transfer Status: NT

6 Hours Lecture, 8 Hours Lab, 12 Hours Outside Study, 26 Total Hours of Instruction
Scheduled: Summer/Spring (even)

II. Coding Information

Repeatability: Not repeatable

Grading Option: Graded

Credit Type: Credit - Degree Applicable

TOP Code: 213300

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Describe characteristics and hazards of flammable gasses and liquids
2. Define and use safety procedures for used in extinguishing liquid fire verses flammable gas fire
3. Identify extinguishing agents and methods of use
4. Identify types of fires and use proper foam and foam extinguishing techniques

B. Course Objectives

Upon completion of this course the student will be able to:

1. Understand elements involved in extinguishing a vehicle fire including vehicle dangers, apparatus positioning, handline selection and fire attack.
2. Recognize characteristics and hazards of flammable gasses and liquid
3. Identify methods and procedures on handling flammable gasses and liquid
4. Identify laws and regulations pertaining to flammable liquids in California and at the national level.

5. Have an opportunity to utilize control methods on flammable gasses and liquids

IV. Course Content

- **Topic 1: Extinguishing an Ignitable Liquid Fire with Foam**

1. Describe how foam prevents or controls a hazard
 - Separating
 - Cooling
 - Smothering
2. List principles by which foam is generated
 - Foam proportioner
 - Aeration
3. Identify causes of poor foam generation and their corrective measures
 - Incorrect ratios of water, concentrate, and air
 - Mismatched educator and nozzle
 - Air leaks in pick-up tube or hose connection
 - Improper flushing after maintenance or previous use
 - Kinked discharge hose line
 - Too much nozzle elevation
 - Too much hose between educator and nozzle
 - Incorrect inlet pressure to educator
 - Partially closed nozzle shut-off
 - Collapsed or obstructed pick-up tube
 - Pick-up tube too long
 - Improper internal flow meter calibration
4. Describe the difference between hydrocarbon and polar solvent fuels and the concentrates that work on each
 - Hydrocarbon fuels
 - Petroleum based
 - Combustible or flammable
 - Float on water
 - Polar solvent fuels
 - Flammable liquids
 - Mix readily with water
 - Class B foam is utilized for both
5. Identify the characteristics, uses, and limitations of firefighting foams
 - Class A
 - Class B
6. Discuss the advantages and disadvantages of using fog nozzles versus foam nozzles for foam application
 - Fog nozzle
 - o Advantage: Produces low expansion short lasting foam, widely available on most apparatus
 - o Disadvantage: May not create the same quality of foam as foam nozzles
 - Foam nozzle
 - o Advantage: Most effective for generating low, medium, or high expansion foam
 - o Disadvantage: Not as versatile as a fog nozzle and generally does not have the same reach

7. Describe foam stream application techniques
 - Rain down
 - Roll in/on
 - Bank back
8. List hazards associated with foam use
 - Can degrade PPE
 - Most are mildly corrosive
 - Environmental impacts
 - Health impacts
9. Describe methods to reduce or avoid hazards
 - Maintain foam blanket to reduce risk of reignition
 - Avoid standing in pools of fuel or run-off water
10. Prepare foam concentrate (or suitable substitute) supply for use
11. Assemble foam stream components
12. Demonstrate foam application techniques
13. Approach and retreat from spills as part of a coordinated team

Application

1. Skills Exercise: Foam Operations

Topic 2 Controlling a Flammable Gas Fire

1. Identify characteristics of pressurized flammable gases
2. List elements of a gas cylinder
3. Identify valve types and their operation
 - Target hazard specific
 - AHJ specific
4. Describe effects of heat and pressure on closed cylinders
5. Describe boiling liquid expanding vapor explosion (BLEVE) signs and effects
6. Describe methods for identifying contents
7. Describe how to identify escape routes and safety zones before approaching flammable gas cylinder fires
8. Describe how techniques used to control flammable gas fires in cylinders can apply to fire control in gas delivery and distribution systems
 - Meters
 - Pipes (above and below ground)
9. Describe water stream usage and demands for pressurized cylinder fires
 - Hand lines
 - Master streams
10. Describe what to do if the fire is prematurely extinguished
11. Describe alternative actions related to various hazards and when to retreat
12. Execute effective advances and retreats
 - Communication
 - Hose management
 - Avoid kinking
 - Ensure proper angle of attack
13. Apply various water application techniques
 - Single attack line
 - Coordinated dual lines
 - Avoid opposing hose streams
 - Master streams
 - Protection systems

14. Assess cylinder integrity and changing cylinder conditions
15. Operate control valves
16. Choose effective procedures when conditions change

Application

1. Skills Exercise: Gas Cylinder Fires
2. Skills Exercise: Gas Meter Fires
3. Skills Exercise: Gas Fires Involving Valves, Flanges and Piping

V. Assignments

A. Appropriate Readings

1. Fundamentals of Fire Fighter Skills, by IAFC, Jones & Bartlett Learning, 4th edition, ISBN: 978-1-284-15133-6
2. Emergency Response Guide (U.S. Department of Transportation, current edition)

B. Writing Assignments

1. Sign off on skills task books

C. Expected Outside Assignments

Properly Don Personal Protective Equipment

D. Specific Assignments that Demonstrate Critical Thinking

Examine, critique and review different types of flammable gas and liquid hazards

VI. Methods of Evaluation

Skills Testing and Class Discussion

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery Correspondence Delivery

Hybrid Delivery

Online Delivery

Lecture and final exam

VIII. Representative Texts and Supplies

Student will be expected to use and maintain SCBA and mask for use provided during class.

IX. Discipline/s Assignment

Fire Technology

X. Course Status

Current Status: Active

Original Approval Date: 03/07/2023

Board Approval Date: 04/11/2023

Chancellor's Office Approval Date:

Revised By: Dan Weaver
Curriculum/Academic Standards Committee Revision Date: