

FIRE 0635 - DRIVER/ OPERATOR 1B - PUMPING APPARATUS OPERATIONS

Catalog Description

Prerequisite: Completion of FIRE 634 with grade of "C" or better, and completion of Firefighter 1, or equivalent as determined by the Fire Technology Program Coordinator, and hold a valid Class C Firefighter endorsed driver's license

Hours: 40 (18 lecture, 22 activity)

Description: Provides information on pumping apparatus preventive maintenance and operations. Topics include routine tests, inspections, and servicing functions; producing hand, master, and foam fire streams, relay pump operations; and supplying water to fire sprinkler and standpipe systems. Students must provide full structural personal protective equipment and fire apparatus for the final three days of class. (not transferable) (not degree applicable) (pass/no pass grading)

Course Student Learning Outcomes

- CSLO #1: Describe various types of fire service pumps and the theory of pump operation.
- CSLO #2: Explain methods of performing basic hydraulic calculations to determine engine and nozzle pressure.
- CSLO #3: Demonstrate basic inspections, documentation, maintenance, and troubleshooting of fire pumps.

Effective Term

Fall 2019

Course Type

Credit - Nondegree-applicable

Contact Hours

40

Outside of Class Hours

47

Total Student Learning Hours

87

Course Objectives

Lecture Objectives:

1. Identify the courses and requirements for the Fire Apparatus Driver/Operator – Pumping Apparatus certification, and be able to describe the certification task book and testing process.
2. Describe and document routine tests, inspections, and servicing functions on the systems and components unique to a pumping apparatus to verify their operational status.
3. Describe pumping systems and components.
4. Explain fire pump and components.
5. Describe and recognize pumping system problems.

6. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods.
7. Explain pump discharge pressure calculations.
8. Outline proper positioning of a pumping apparatus.
9. Describe the safe operation of the pump.
10. Identify the problems related to small-diameter or dead-end mains.
11. Compare low-pressure and private water supply systems.
12. Distinguish hydrant coding systems.
13. Describe the principles of drafting and reliable static water sources.
14. Explain the need for relay pumping operations.
15. Explain hydraulic calculations for friction loss and flow using both written formulas and estimation methods.
16. Explain pump discharge pressure calculations.
17. Describe proportioning rates and concentrations.
18. Identify foam system limitations.
19. Identify fire department connections.
20. Explain pump discharge pressure for fire sprinklers and standpipe systems.

Laboratory Objectives:

1. Demonstrate how to inspect fire pump and components.
2. Demonstrate how to position a pumping apparatus to operate at a fire hydrant and at a static water source.
3. Demonstrate how to draft.
4. Demonstrate how to operate pumper pressure control systems.
5. Operate the volume/pressure transfer valve (multistage pumps only).
6. Operate auxiliary cooling systems.
7. Demonstrate how to make the transition between internal and external water sources.
8. Demonstrate how to assemble hose lines, nozzles, valves, and appliances.
9. Demonstrate how to apply hydraulic calculations to produce an effective stream.
10. Demonstrate how to relay pump.
11. Demonstrate how to operate foam proportioning equipment.
12. Demonstrate how to operate and pump to a sprinkler and standpipe system.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

Methods of Evaluation

- Objective Examinations
 - Example: Students will take a multiple choice test on pumping apparatus operations. Evaluation via standard grading system. Example Question: What is the most common source of flow restrictions when performing a drafting operation? A. Lack of pressure, B. Clogged Strainer, C. Broken primer pump, D. Air Leaks
- Problem Solving Examinations
 - Example: Given a hydraulic calculation, students will calculate the correct pressure within 10 psi. Example: Fire on the 3rd floor of a hotel and crews have extended 300 feet of 1-3/4" hose to attack the fire. What is the proper pump pressure? Grading is Pass/Fail based on industry standard.
- Skill Demonstrations

- Example: Students will demonstrate the ability to calculate and pump water from one fire engine to another in a relay pump operation. Pass/Fail grading based on industry standard.

- OER Link:
- OER:

Repeatable

No

Methods of Instruction

- Activity
- Lecture/Discussion

Activity:

1. The instructor will lecture on how to inspect a pump priming system and students will then perform an inspection of a priming system.

Lecture:

1. The instructor will lead a class discussion of troubleshooting techniques for a malfunctioning pump. Students will then be given scenarios involving a malfunctioning pump and determine the proper sequence and procedure to resolve the problem.

Typical Out of Class Assignments

Reading Assignments

1. The student will read the chapter in the textbook on relay pumping operations and complete a worksheet calculating pump pressure for various relay fire flows. 2. The student will read the chapter in the textbook on pump maintenance and complete a daily checkout for a fire engine pumping apparatus.

Writing, Problem Solving or Performance

1. Daily mathematical homework exercises using various hydraulic formulas. 2. Prepare a diagram of water flow through a two stage centrifugal pump in both the volume and pressure setting.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Fire Apparatus Driver/Operator
 - Author: International Association of Fire Chiefs and National Fire Protection Association
 - Publisher: Jones and Bartlett Learning
 - Publication Date: 2016
 - Text Edition: 2nd
 - Classic Textbook?:
 - OER Link:
 - OER:
- Pumping Aerial Apparatus Driver Operator Handbook
 - Author: International Fire Service Training Association
 - Publisher: Fire Protection Publications
 - Publication Date: 2015
 - Text Edition: 3rd
 - Classic Textbook?:

Other materials and-or supplies required of students that contribute to the cost of the course.