FRS 2031 **PUMP OPERATIONS LEVEL II**

Lecture	Skill	Fractional Credit
8	0	0.5

Course Description

This course includes the minimum requirements of professional competence of fire service pump operators.

Prerequisites: FRS 2023 or Consent **Corequisite: None**

Task List

1.	Identify the pipe sizes used in water distribution systems for residential, business, and industrial districts.
2.	Identify at least two causes of increased resistance or friction loss with water flowing in water mains.
3.	Identify the NFPA recommended color code system for fire hydrants, or the color code system used in that particular community.
4.	Identify who is responsible for water system maintenance, use, and testing.
5.	Identify private water supply systems and shall explain the operation, care and maintenance of those systems.
6.	Identify three alternative emergency water supply sources.
7.	Identify the components of mobile water supply operations.
8.	Demonstrate the principles of friction loss as they relate to: a. Internal diameter of hose; b. Length of hose line; c. Manner in which hose lines are laid; d. Physical condition of hose; e. Pressure; f. Use of appliances; g. Use of multiple hose lines; h. Use of various nozzles; and i. Velocity of flow.
9.	Identify the following types of fluid pressure encountered in the fire service: a. Flow pressure; b. Negative pressure; c. Normal operating pressure; d. Residual pressure; and e. Static pressure.
10.	Identify the following terms that relate to the basic principles of fire service hydraulics: a. Atmospheric pressure; b. Capacity; c. Displacement; d. Flow (GPM); e. Friction Loss; f. Head pressure (gain or loss); g. Hydrant pressure; h. Net engine pressure; i. Nozzle reaction; j. Pounds per square inch (PSI); k. Pump discharge pressure; l. Vacuum; m. Velocity; and n. Water hammer.
11.	Demonstrate the use of proportions in mathematical calculations as required to solve fire department pumper hydraulics problems.
12.	Identify and demonstrate the determination and use of square roots as required to solve fire department pumper hydraulic problems.
13.	Identify and demonstrate the use of fractions, percentages, and decimal fractions in mathematical calculations as required to solve fire department pumper hydraulic problems.

14.	Demonstrate the use of algebraic formulas to solve fire department pumper hydraulic problems.
15.	Given a series of fireground situations and using the written formulas specified determine: a. Nozzle or pump discharge pressures when the length and size of hose, and size of nozzle are given; b. Water flow in gallons per minute (GPM) when the diameter of the orifice are given; c. Friction loss in the supply and attack lines, used by the authority having jurisdiction, when the gpm flow is given; d. Friction loss in siamesed lines when size of hose and gpm flow are given; e. Friction loss in wyed lines when size of hose and gpm flow are given; f. Friction loss in multiple lines when the size of hose and gpm flow are given; and g. An estimated remaining available volume from a hydrant while pumping a given volume.
16.	Given a series of fireground situations, mentally calculate correct pump discharge pressure, gpm, friction loss, and nozzle pressure, using formulas specified by the authority having jurisdiction.
17	Given a series of fireground situations involving various operating pressures, demonstrate the calculation of nozzle reaction of hand and master streams used by the authority having jurisdiction.
18.	Given the necessary information, shall compute the maximum life of a fire department pumper.
19.	Identify three methods of power transfer from the vehicle engine to the pump.
20.	Identify the theory and principles of pumper priming systems.
21.	Identify the theory and principles of pumper pressure relief systems and pressure control governors.
22.	Given a fire department pumper, identify all pump gauges and demonstrate their use.
23.	Identify the auxiliary cooling systems and explain their function.
24.	Given a fire department pumper, demonstrate the method(s) of power transfer from vehicle engine to pump.
25.	Given a fire department pumper and a series of fireground situations, produce effective hand and master streams specified by the authority having jurisdiction.
26.	Given a fire department pumper, shall draft water, and demonstrate a systems check when the pumper will not draft.
27.	Demonstrate the operations of the different types of fire department pumpers used by the authority having jurisdiction.
28.	Given a fire department pumper, properly position, set up the apparatus, and perform the following operations: a. Pump at maximum delivery rate from the apparatus water tank; b. Pump at maximum rated capacity from a hydrant; c. Pump at maximum rated capacity from draft; d. Pump in a relay operation; e. Pump in a tandem pumping operation; and f. Pump in a dual pumping operation.
29.	Given a fire department pumper and a simulated fire scene, demonstrate proper maneuvering and positioning of the apparatus to function from the given source of water.
30.	Given a fire department pumper with a multiple-stage pump, demonstrate the operation of the volume/pressure transfer valve under actual pumping conditions.
31.	Given a fire department pumper, locate, identify, and demonstrate the operation of all equipment carried on or attached to that pumper.
32.	Identify the characteristics and limitations of hard and soft pumper supply hose.
33.	Given a selection of nozzles and tips, identify the type, design operating, nozzle pressure, and flow in gpm for proper operation of each.
34.	Given a fire department pumper, demonstrate the operation of the pumper pressure relief system, or the pressure control governor, or both.
35.	Given a fire department pumper, demonstrate the operation of the auxiliary cooling system.
36.	Given a series of fireground situations identify the capabilities and limitations of the water supply operation.
37.	Identify the factors affecting the effective range of elevated master streams.
38.	Identify the causes and hazards of nozzle reaction of elevated master streams.

Lecture
Instructor Equipment List
Projection screen
Chalkboard or marker board
Overhead projector
Slide projector
TV/VCR

Skills
Instructor Equipment List
Projection screen
Chalkboard or marker board
Overhead projector
Slide projector
TV/VCR