

Lassen Community College Course Outline

FS 65B Driver/Operator 1B: Pump Operations

1.5 Units

I. Catalog Description

Course provides the student with the information, theory, methods and techniques for operating fire service pumps, including: types of pumps, engine and pump gauges maintenance, unsafe pumping conditions, pressure relief devices, cooling systems, water supplies, drafting field hydraulics, and pumping operations. A supplemental State Fire Training CFSTES certification fee of \$141.00 is due to Lassen Community College and will be collected at the time of registration

Prerequisites: FS 65A Driver/Operator 1A: Emergency Vehicle Operations
OSFM Fire Fighter I or 2 years Volunteer FF

Requisites:

Note: If possible, student should bring an agency apparatus. Student must possess a valid Class C Firefighter Endorsed driver's license (minimum).

Transfer Status: NT

18 Hours Lecture, 27 Hours Lab, 36 Hours Outside Work: 81 Total Student Learning Hours
Scheduled: Spring

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 successful completion of the course the student will be able to:

1. Fire Engine Set Up: Set up a fire engine to draft water from a static water source, pump and flow water from through at least five hose lines of varying sizes and lengths while maintaining correct nozzle flows and pressures for each of the flows for each of the five lines.
2. Centrifugal Pumps: Describe the characteristics and design of centrifugal pumps.
3. Principles of Fluid Pressure: Describe the principles of fluid pressure.

B. Course Objectives

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

1. Identify the types and uses of fire service fire pumps.
2. Correctly operate a fire pump under the following conditions: -
 1. From draft
 2. From a hydrant
 3. From a tank
 4. During relay pump operations
 5. During tandem pump operations
 6. While flowing same size lines
 7. While flowing different size lines

3. Demonstrate daily, weekly, monthly and yearly pump testing and service.
4. Given a simulated fire situation, calculate fire flows, friction loss, nozzle pressure/reaction force, and engine pressures for a set of non-uniform hose sizes and lengths.

IV. Course Content

1. Characteristics and design of centrifugal pumps
2. Principles of single and multiple stage centrifugal pumps
3. Series and parallel pumping operations
4. Percentage of rated pump capacity
5. Rated pump pressures
6. Pump capacities in gallons per minute at rated pressures
7. Conditions that cause pump damage and unsafe pumping operations
8. Measures used to correct unsafe pumping conditions
9. How to operate power transfer systems
10. How to operate automatic pressure regulators
11. How to operate pump transfer valves
12. How to operate priming devices
13. How to operate auxiliary cooling systems
14. How to perform an annual pump service test results
15. Factors affecting pump service tests
16. Principles of drafting
17. How to spot apparatus for drafting
18. Conditions affecting drafting operations
19. How to make non-collapsible hose connections for drafting
20. How to operate pump
 - A. from draft
 - B. from a tank
 - C. from a hydrant
 - D. in a relay operation
 - E. in tandem operation
21. Characteristics and design of fire hydrants
22. Local policies governing location and types of hydrants in use
23. Principles of water distribution systems
24. How to determine required fire flow
25. How to determine available fire flow
26. Auxiliary source of water supply
27. Non-fire service vehicles as water supply apparatus
28. Design a construction of mobile water supply apparatus
29. Water shuttle operations
30. How to use portable pumps
31. How to use portable tanks
32. How to use water ejectors
33. Utilization of large diameter hose
34. Utilization of portable and auxiliary water sources
35. Fire service hydraulics terms and definitions
36. Principles of fluid pressure
37. Factors of fluid pressure
38. Factors affecting friction loss
39. Determination of maximum lift
40. How to calculate engine lift

41. How to calculate water flow in gallons per minute
42. How to calculate friction loss
 - A. single lines
 - B. multiple lines
 - C. Wyed lines
 - D. Siamese lines
 - E. Master streams
43. How to calculate head pressure
44. How to determine hydrant capability based on residual pressure
45. Characteristics and design of fire service nozzles
46. Utilize mental formulas to calculate friction loss
47. Considerations for connecting to sprinkler and standpipe systems
48. How to augment water supply to sprinkler and standpipe systems
49. Characteristics and design of foam making equipment
50. Utilize foam making equipment to produce foam streams
51. How to apportion stream penetrants
52. Hydraulics lab
53. Pump test

V. Assignments

A. Appropriate Readings

Read the certification task book for Driver/Operator – Pumping Apparatus.
Read the maintenance and inspection forms, manufacturer’s specifications and requirements, and policies and procedures for the student’s jurisdiction.

B. Writing Assignments

Document routine tests, inspections, and servicing functions on the systems and components unique to a pumping apparatus to verify their operational status.
Draw a diagram of a pump and its related pumping.

C. Expected Outside Assignments

Calculate pump discharge pressures.

D. Specific Assignments that Demonstrate Critical Thinking

For credit courses, describe at least one typical assignment which includes critical thinking, writing, and problem solving skills:

Given a fire engine, the student will set up the engine to draft from a static water source, pump and flow water through at least five hose lines of varying sizes and lengths. The student will correctly calculate nozzle flows and pressures for each of the five lines based on inputs provided by the instructor.

VI. Methods of Evaluation

Traditional Evaluation

Written examinations, oral examinations, and manipulative examinations.

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

Traditional Classroom Delivery

Lecture, discussion, audio/visual aids, demonstration, group exercises, guest speakers, lab, individualized programs and other as needed.

VIII. Representative Texts and Supplies

May include textbooks, manuals, periodicals, software, and other resources.

Fire Apparatus Driver/Operator, 3rd Edition, Jones & Bartlett, ISBN 9781284147612

or

Pumping and Aerial Apparatus Driver/Operator Handbook, Third Edition, IFSTA, ISBN: 9780879395711

IX. Discipline/s Assignment

Fire Technology

X. Course Status

Current Status: Active

Original Approval Date: 10/17/2017

Board Approval Date: 11/14/2017

Chancellor's Office Approval Date: 11/22/2017

Revised By: Dan Weaver

Latest Curriculum/Academic Standards Committee Revision Date: 10/04/2022