COURSE OUTLINE

Fire Technology 107 Fire Hydraulics

I. <u>Catalog Statement</u>

Fire Technology 107 is designed for review of basic mathematics, hydraulic laws and formulas as applied to the fire service, application of formulas and mental calculation to hydraulic problems, water supply problems, underwriter's requirements for pumps.

Total Lecture Units: 3.0 **Total Course Units: 3.0**

Total Lecture Hours: 48.0

Total Faculty Contact Hours: 48.0

Prerequisite: Fire Technology 101 or equivalent.

II. Course Entry Expectations

Skills Levels Ranges: Reading 5; Writing 5; Listening/Speaking 5; Math 3.

Prior to enrolling in the course, the student should be able to:

- 1. describe and discuss the components of the history and philosophy of the modern day fire service;
- 2. analyze the basic components of fire as a chemical reaction, the major phases of fire, and examine the main factors that influence fire spread and behavior;
- 3. differentiate between fire service training and education; fire protection certificate program and a fire service degree program; and explain the value of education in the fire service:
- 4. list and describe the major organizations that provide emergency response service and illustrate how they interrelate;
- 5. identify fire protection and emergency-service careers in both the public and in the private sector;
- 6. synthesize the role of national, state and local support organizations in fire protection and emergency services;
- 7. discuss and describe the scope, purpose, and organizational structure of fire and emergency services;
- 8. describe the common types of fire and emergency services facilities, equipment, and apparatus;
- 9. compare and contrast effective management concepts for various emergency situations;

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10. identify and explain the components of fire prevention including code enforcement, public information, and public and private fire protection systems.

III. Course Exit Standards

Upon successful completion of the required coursework, the student should be able to:

- 1. review basic mathematics;
- 2. demonstrate knowledge of elementary principles of hydraulics;
- 3. provide practical verification of competencies in calculations, specifications and pressure required in use of water supplies.

IV. Course Content

Total Faculty Contact Hours = 48

A. Review of Mathematics

- 1. Basic mathematics
- 2. Formulas
- B. Elementary Principles of Hydraulics

4 hours

6 hours

- 1. General hydraulic data
- 2. Principles of pressures in fluids
- 3. Hydraulic measurements
- 4. Back pressure and head pressure
- C. Velocity of Flow and Rate of Discharge

4 hours

- 1. Definition
- 2. Determining velocity
- 3. Determining discharge
- D. Friction Loss 4 hours
 - 1. Physics of friction loss
 - 2. Friction loss rules
 - 3. Friction loss in hose
 - 4. Friction loss in various transmission systems
- E. Calculating Engine and Nozzle Pressure

6 hours

6 hours

- 1. Formulas
- 2. Mental formulas
- F. Discharge
 - 1. Nozzles
 - 2. Fire protection systems
- G. Fire Streams 6 hours
 - 1. Specifications
 - 2. Nozzle selection
 - 3. Vertical and horizontal reaxh

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- 4. Penetration
- 5. Effective pressures

H. Fire Pumps

6 hours

- 1. Specifications
- 2. Design
- 3. Power supply

I. Water Supply

6 hours

- 1. Source
- 2. Mains
- 3. Hydrants

V. Methods of Instruction

The following methods of instruction may be used in the course:

- 1. lecture;
- 2. demonstration;
- 3. films;
- 4. simulations.

VI. Out of Class Assignments

The following out of class assignments may be used in the course:

- 1. individual projects (i.e. written assignments, reading reports);
- 2. group projects (i.e. homework problems, problem solving demonstrations, discussion on textbook topics).

VII. Methods of Evaluation

The following methods of evaluation may be used in the course:

- 1. quizzes;
- 2. midterm examination;
- 3. final examination.

VIII. <u>Textbooks</u>

James, Casey, *Fire Service Hydraulics*. 10th Grade Textbook Reading Level.

Sheppard, Fred, *Fire Service Hydraulics*. 10th Grade Textbook Reading Level.

IX. Student Learning Outcomes

1. Student will be able to demonstrate knowledge of basic mathematics.

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- 2. Student will be able to demonstrate knowledge of elementary principles of hydraulics.
- 3. Student will be able to provide practical verification of competencies in calculations, specifications and pressure required in use of water supplies.