COURSE INFORMATION FORM

<table>
<thead>
<tr>
<th>DISCIPLINE</th>
<th>Fire Science</th>
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<tr>
<td>COURSE TITLE</td>
<td>Fire Protection Hydraulics and Water Supply</td>
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<td>CR.HR</td>
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<td>LECT HR</td>
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CATALOG DESCRIPTION

This course provides a foundation of theoretical knowledge in order to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and to solve water supply problems.

PREREQUISITES

MATH 100, equivalent or higher

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

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

1. Apply the application of mathematics and physics to the movement of water in fire suppression activities.

2. Identify the design principles of fire service pumping apparatus.

3. Analyze community fire flow demand criteria.

4. Demonstrate, through problem solving, a thorough understanding of the principles of forces that affect water at rest and, in motion.

5. List and describe the various types of water distribution systems.

6. Discuss the various types of fire pumps.
GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

3 Lifelong Learning

A. Personal and Professional Development
   • Pursue structured learning opportunities, certification, and/or degrees (1, 2, 3, 4)

C. Attributes of an Awareness of the Convergence of Knowledge
   • Apply learned skills to real world interactions (1, 2, 3, 4)
   • Synthesize information to facilitate application (1, 2, 3, 4)
   • Seek new solutions to new and old problems (1, 2, 3, 4)
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

Provide a foundation for theoretical knowledge in order to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and to solve water supply problems

- Apply the application of mathematics and physics to the movement of water in fire suppression activities.
- Identify the design principles of fire service pumping apparatus
- Demonstrate, through problem solving, a thorough understanding of the principles of forces that affect water at rest and, in motion

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Students will be evaluated for mastery of learning objectives by written examination, on-line discussions, and assignments
This course provides a foundation of theoretical knowledge in order to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and to solve water supply problems.

I. Water as an extinguishing agent
   A. Physical properties
   B. Terms and definitions

II. Math review
   A. Fractions
   B. Ratios, proportions, and percentage
   C. Powers and roots

III. Water at rest
   A. Basic principles of hydrostatics
      1. Pressure and force
      2. Six principles of fluid pressure
      3. Pressure as a function of height and density
      4. Atmospheric pressure
   B. Measuring devices for static pressure

IV. Water in motion
   A. Basic principles of hydrokinetics
   B. Measuring devices for measuring flow
   C. Relationship of discharge velocity, orifice size, and flow

V. Water distribution systems
   A. Water sources
   B. Public water distribution systems
   C. Private water distribution systems
   D. Friction loss in piping systems
   E. Fire hydrants and flow testing

VI. Fire Pumps
   A. Pump theory
   B. Pump classifications
   C. Priming systems
   D. Pump capacity
   E. Pump gauges and control devices
   F. Testing fire pumps

VII. Fire streams
   A. Calculating fire flow requirements
   B. Effective horizontal and vertical reach
   C. Appliances for nozzles
   D. Performance of smooth-bore and combination nozzles
   E. Hand-held lines
   F. Master streams
   G. Nozzle pressures and reaction
   H. Water hammer and cavitations
VIII. Friction loss
   A. Factors affecting friction loss
   B. Maximum efficient flow in fire hose
   C. Calculating friction loss in fire hose
   D. Friction loss in appliances
   E. Reducing friction loss

IX. Engine pressures, factors affecting engine pressure

X. Standpipe and sprinkler systems
   A. Standpipe systems
      1. Classifications
      2. Components
      3. Supplying Standpipe Systems
   B. Sprinkler systems
      1. Classifications
      2. Components
      3. Supplying sprinkler systems