

ENFP310 Water-based Fire Protection Systems Design

Credits: Three credits, three 50 minute lectures weekly

Instructor: Kenneth E. Isman, P.E.

Textbooks:

- *Layout, Detail and Calculation of Fire Sprinkler Systems*, Edited by Kenneth E. Isman, Published by the National Fire Sprinkler Association, 2012
- NFPA 13 – 2016 Edition (on-line version provided to students for free)

Specific course information:

1. This course will present students with an introduction to aqueous fire suppression systems. Key fluid dynamic and heat transfer processes will be covered so that students can design and analyze a water based fire protection system. This ability will be demonstrated through a sprinkler design project at the end of the semester.
2. Prerequisites: Fluid Mechanics (ENFP 300)
3. Required Course

Specific goals for the course:

1. Upon completion of this course, students should be able to:
 - Identify sprinkler design criteria in accordance with nationally recognized standards
 - Specify the types, locations and positions of sprinklers in a building
 - Perform hydraulic calculations to determine the demand of a sprinkler system
 - Evaluate whether a given water supply is adequate for a system
 - Use fire pumps as a solution to insufficient pressure from a water supply
 - Test fire pumps
2. This course focuses on two SOs:
 - SO3 - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
 - SO9 - A recognition of the need for, and an ability to engage in life-long learning

Brief list of topics:

- History of sprinklers
- Listing of products/How do sprinklers get listed?
- Contracts, specifications and the role of the engineer
- Underground pipe/thrust blocks
- Wet, dry, preaction and deluge sprinkler systems
- Sprinkler spacing and location (including what spaces get sprinklers within a building)

- Pipe types and configurations
- Hangers and seismic design considerations
- Hydraulic calculations
- Fire pumps
- Standpipe systems
- Tanks for fire protection