

ENFP440 Smoke Management and Fire Alarm Systems

Credits: three credits, two 75-minute lectures weekly

Instructor: James Milke and Ken Isman

Textbook: John H. Klote; James A Milke; Paul G Turnbull; Ahmed Kashef; Michael J Ferreira, *Handbook of Smoke Control Engineering*, ASHRAE, Atlanta, 2012.

Specific course information:

1. Catalog Description: This course analyzes the hazards posed by smoke in buildings. Performance characteristics of smoke management systems. Review of analytical design aids. Functional analysis and design of fire detection and alerting systems. Examination and evaluation of code criteria, performance specifications and research.
2. Prerequisites: ENFP 300
3. Required Course

Specific goals for the course:

1. Upon completion of this course the students should be able to:
 - Review methods to assess the hazard of smoke in buildings
 - Review smoke management methods, including smoke control systems and smoke exhaust systems employing natural or mechanical methods.
 - Study current technologies associated with fire alarm and detection systems
 - Explore fundamental concepts of fire detection and alarm systems design
 - Review engineering tools to assess the performance of smoke management systems and fire detection and alarm systems.
2. This course focuses on two SOs:
 - SO4 - An ability to function on multidisciplinary teams.
 - SO10 - A knowledge of contemporary issues.

Brief list of topics:

Problem of smoke, Design objectives, smoke management design approaches
Smoke movement forces: Buoyancy, gas expansion, wind, influence of building systems
Air movement analysis: Leakage and air movement paths in buildings, Network analysis/CONTAM
Stairwell pressurization systems and zoned smoke control systems: Means of pressurization, analysis of performance via hand computations and CONTAM
Smoke Management in Large Spaces: Mechanical venting, natural venting
Fire signatures, detection concepts and principles
Review of current technologies associated with fire detectors
Performance characteristics of heat, smoke and flame detection
Alarm system classifications, components, design criteria
Performance characteristics of alerting devices
Fire detection and alarm system evaluation