ENFP440 Smoke Management and Fire Alarm Systems

Credits: Three (3)

Contact hours: Two lectures per week, 75 minutes each.

Table 5-1 category: Engineering topic with significant design component

Instructor: Hrybyk and Johnson

Textbook: John H. Klote; James A Milke; Paul G Turnbull; Ahmed Kashef; Michael J Ferreira, *Handbook of Smoke Control Engineering*, ASHRAE, Atlanta, 2012. (On-line versions provided free to students).

Other supplemental materials:
SFPE Handbook of Fire Protection Engineering, 5th Edition, M. Hurley (ed), New York: Springer, 2015.
NFPA 72, NFPA 92. (On-line versions provided free to students).

Catalog description:
Analysis of hazard 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.

Prerequisites and Corequisites:
Co-requisite: Must have completed with a C- or better or concurrently be enrolled in ENFP300.
Restriction: Permission of ENGR-Fire Protection Engineering department.

Credit only granted for: ENFP440 or ENFP627.

Table 5-1 Course Type: Required

Specific outcomes of instruction:
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.

Student outcomes assessed: SO4.2, SO5

Brief list of topics covered:
- 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& Ventus
- Stairwell pressurization systems and zoned smoke control systems: Means of pressurization, analysis of performance via hand computations and CONTAM and Ventus
- 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