

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY

ENE 228 – BUILDING AUTOMATION & ENERGY MANAGEMENT SYSTEMS (3 CR.)

Course Description

Introduces building automation and energy management systems. Studies how building systems HVAC, lighting, security systems, and alternative energy--can communicate through a network of intelligent control devices. Emphasizes how these controlling devices work together in common automation. Lecture 2 hours, Lab 2 hours, Total 4 hours per week.

General Course Purpose

Building Automation and Energy Management Systems will provide an overview of the many facets of controlled building systems and a comprehensive foundation for the integration of commercial building systems: HVAC, lighting, security systems, and alternative energy for automated operation. This course will cover the devices used in monitoring and controlling building systems, terminology used in the industry, types and applications for HVAC, lighting, security, energy systems, and safety training.

Course Prerequisites/Corequisites

None

Course Objectives

Upon completing the course, the student will be able to demonstrate how different controlling systems such as electrical, lighting, HVAC, plumbing, fire protection, security, access control, Voice-to-Data, and elevator work to control automation of the entire building. Specifically, the student will be able to:

- a) Explain the function of the different controlling devices for each system and explain the interaction among the systems within a building.
- b) Explain the benefits of automating the energy management of a building, including significant energy savings, improved control, comfort, security, and convenience.
- c) Explain why monitoring and controlling the electrical system is required to protect the integrity of this automation system.
- d) Describe how lighting is one the simplest systems to control.
- e) Explain in detail the application control devices and explain how their interrelationships are vital to the success of automation of HVAC systems.
- f) Evaluate the control strategies and results of plumbing control applications.
- g) Explain the operation of a fire control system and its interfaces at the control panel with other building systems for a complete and safe evacuation.
- h) Describe the operation of security systems and their integration with other building systems.
- i) Explain the primary function of an access control system and describe strategies for integrating with other building systems.
- j) Evaluate how VDV (Voice-Data-Video) control information can be used to integrate with other building systems.
- k) Compare the types of elevators by function and operation and explain the interaction with their control operation throughout the building.
- l) Identify the ways in which controls for different building systems interact in an integrated building automation system.
- m) Evaluate the possible control applications for building automation systems.

Major Topics to Be Included

Critical attention will be given to the following topics:

- a) Introduction to Building Automation and Energy
- b) Electrical systems
- c) Lighting systems
- d) HVAC
- e) Plumbing
- f) Fire Protection
- g) Security
- h) Access Control
- i) Voice - Data - Video
- j) Elevator
- k) Automated Building Operation