ELE 481: DIGITAL CONTROL SYSTEMS (elective)

Credit: 3 hours.

Catalog Description: Introduction to digital and sampled-data control systems. Analysis and design of digital systems using z transform and state space methods. A study of the effects of quantization and sampling upon stability and performance.

Prerequisites: ELE 480.


Topics Covered:

1. Introduction to digital control systems
2. Signal Conversion & Processing
3. Z-Transforms
4. Zero order, fractional order, first order hold circuits
5. State-variable theory for digital and sampled-data systems
6. Stability of digital control systems
7. Digital Simulation
8. Time-Domain Analysis
9. Frequency-Domain Analysis in the z-Plane
10. Controllability and Observability
11. Design of Digital Control Systems
12. Microprocessor Control

Class/Laboratory Schedule:
Lecture: 3 hours/week
Lab: none

Course Objectives and Relationship to Program Outcomes:

• To learn the fundamentals of control of discrete time systems. (Outcome A, E, K).
• To be able to analyze and design of simple discrete control systems. (Outcome A, C, E, K).
• To give the students an opportunity to analyze data from simulated projects. (Outcome A, B, C, E, K).
• To give the students an experience writing reports based on simulation and analysis projects. (Outcome B, G, K).
• To give the students an experience researching topics on discrete control systems and making an oral and written report based on their research. (Outcome G, I, K).
• To give the students an appreciation the current state of discrete control systems and a realization that there is considerably more to be learned about power electronics. (Outcome I, J).
Coverage (and level) of ABET Outcomes: A (3), B (2), C (2), D (2), E (3), F (1), G (1), I (1), J (1) and K (3).

Contribution of Course to meeting the Professional Component:
   Engineering Topics: 100%

Date: June 2004.