EC E 577, Automatic Controls Laboratory

1. Credits : 3  Contact Hours : 6.3
2. Textbook and Materials : Any textbook used for an introductory controls course

   a. Other Supplemental Materials : None

   • Specific Course Information :

   a. Brief description of the content of the course (Course Catalog Description) : Control theory is reduced to engineering practice through the analysis and design of actual systems in the laboratory. Experiments are conducted with modern servo systems using both analog and digital control. Systems identification and modern controls design are applied to motion and torque control.

   b. Pre-requisites or Co-requisites : ME 446 & 447 or ECE 332 & 416 or cons inst

   c. This is a Selected Elective course.

   • Specific Goals for the Course :

   a. Course Outcomes :

   1. The objective of this course is to provide experience with both breadth and depth in designing, constructing, and debugging real-time control systems, with emphasis on understanding the use and limits of theoretical controls design methods in practical environments.

   • ABET Student Learning Outcomes :

   (a) Ability to apply mathematics, science and engineering principles.
(b) Ability to design and conduct experiments, analyze and interpret data.
(c) Ability to design a system, component, or process to meet desired needs.
(d) Ability to function on multidisciplinary teams.
(e) Ability to identify, formulate and solve engineering problems.
(g) Ability to communicate effectively.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:**

  System identification using frequency domain methodologies

  Hardware closed loop controller implementation using state variable techniques for current loops and motion control, including hardware observers and disturbance input decoupling
  - Time domain (z-transform) systems identification methodologies

  Computer closed loop controller implementation of state variable motion control including state command feedforward and acceleration observers

  PLC-based, modern (structured) and classical methods for sequential logic design.