Course Syllabus

ELCT 33 – Control Systems

Course Coordinator: Undergraduate Program Committee


Credit Hours 3

Prerequisite(s) by course C or better in ELCT 222

Prerequisite by topics Signals & Systems, Convolution, Fourier series & transform, Differential Equation, Modulation, Time Sampling, Feedback


Other Materials Class notes posted on Blackboard

Learning Outcomes:
Students who successfully complete the course will be able to:

1. demonstrate an understanding of the fundamentals of (feedback) control systems.
2. determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
3. express and solve system equations in state-variable form (state variable models).
4. determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
5. determine the (absolute) stability of a closed-loop control system
6. apply root-locus technique to analyze and design control systems.
7. communicate design results in written reports.

Course Topics:

• Introduction to Control Systems
• Laplace Transforms
• Transfer Function, Stability
• Block Diagrams and Signal Flow Graphs
• Physical Systems Modeling
• Root Locus Analysis
• Time Domain Analysis of Control Systems
• Frequency Domain Analysis of Control Systems
• Control System Design (separated in different topics)

Course Contribution to Program Outcomes:
ELCT 331 contributes to an achievement of:

• Outcome 1 – an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
• Outcome 4 – an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal context.
• Outcome 7 – an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
General Course Policies

Academic Integrity
Unless otherwise stated, assignments and examination work are expected to be the sole effort of the student submitting the work. Students are expected to follow the University of South Carolina Honor Code and they should expect that every instance of a suspected violation will be reported. Students found responsible for violations of the Code will be subject to academic penalties under the Code in addition to whatever disciplinary sanctions are applied.

Accommodating Disabilities
Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

Diversity
When scheduling exams, I have attempted to avoid conflicts with major religious holidays. If, however, I have inadvertently scheduled an exam or major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements.

Recommended Study Habits
- Read the assigned material before class.
- Bring thoughtful questions to class for discussion.
- Prepare for the exams in study groups.
- Take notes during class discussions and while completing reading assignments.

Deviations
Minor deviations from the syllabus are a normal part of any adaptive teaching and learning process.