Control System Design - Fall 2015

A Joint Class for EENG 4310-001, EENG 5310-001 and EENG 5310-605

Instructor: Parthasarathy (Partha) Guturu
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Phone: 940-891-6877
Email: guturu@unt.edu
Teaching Assistant: TBD.
Class Hours: M/W 12:30 PM-1:50 PM
Class Room: NTRP B-217.
Office Hours: T 2:00PM-3:30 PM. Students unable to see me during this time may request an appointment.
Prerequisite: Senior/Graduate standing

Reference Books:

PowerPoint Slides

Attendance Policy: In view of the continuous evaluation strategy adopted by the instructor, perfect attendance is recommended for those aspiring to get good grades.

Grading Policy: Assignments/Quizzes/Class Tests: 35, Project: 35, and Final Examination: 30. There will be separate assignments, exams and projects for undergraduate and graduate students.

Academic Dishonesty: Honesty is the best policy. Cheating will not be tolerated. Anyone found guilty of cheating on a test or assignment will be awarded an F grade for the course. Discussions of problems and assignment with your classmates is welcome and encouraged, however, sharing of solutions is not. If you need help, you should ask the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation. For your rights and responsibilities please refer to http://www.unt.edu/csrr

Statement regarding Disabled Students: The Faculty of Electrical Engineering including this instructor cooperates with the Office of Disability Accommodation (ODA) to make reasonable accommodations for students with certified disabilities (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act). If you have not registered with ODA, we encourage you to do so immediately and present a written accommodation request along with an appropriate documentation from the Dean of Students Office http://www.unt.edu/oda/, on or before the 2nd week of class.
Final Exam Date and Time: TBD.

Course Outline and Delivery Plan

1. Introduction to control Systems, taxonomy of control systems, example systems, ethical, professional and Contemporary Issues (Week 1)

2. Mathematical modeling of dynamical systems: Laplace and Z-Transforms, and State-space Representation (Weeks 2 and 3)


4. Frequency domain approaches to analysis and design of linear feedback systems: Bode’s plots, Nyquist stability criterion, and Nicholos charts (Weeks 7, 8 and 9)

5. State-space methods for design of Linear Feedback Control Systems: Controllability and Observability concepts, Canonical Forms, and eigen-value approaches to stability (Weeks 10 through 14)

6. Introduction to Digital (Sampled Data) Control Systems (Week 15)

Course Learning Outcomes

After completion of this course, the students will achieve the following learning outcomes:

[CLO-1] Knowledge of various kinds of control systems and typical examples

[CLO-2] Knowledge of Ethical and Professional Issues related to Control System Engineering

[CLO-3] Knowledge of Contemporary Issues related to Control System Engineering

[CLO-4] Proficiency in Mathematical Modeling of Dynamical Systems

[CLO-5] Proficiency in the Design of Stable Linear Feedback Control Systems using Classical Control Theory

[CLO-6] Proficiency in the Design of Stable Linear Feedback Control Systems using modern State Space Approach

[CLO-7] Knowledge of the basic concepts related to sample data control systems

[CLO-8] Proficiency in Design, Development and Implementation of a Control System Design Project with an understanding of professional, ethical and contemporary issues

[CLO-9] Proficiency in a control system project reporting

Our EE Program Outcomes (POs)

Upon completion of our BSEE program, the students will be able to:

[PO-1] Apply knowledge of mathematics, engineering and science.

[PO-2] Design and conduct experiments to verify and validate the design projects developed by them, and analyze and interpret data.

[PO-3] Develop project-based learning skills through design and implementation of a system, component, or process
that meets the needs within realistic constraints.

[PO-4] Function on multidisciplinary teams.

[PO-5] Identify, formulate, and solve engineering problems.

[PO-6] Have an understanding of professional and ethical responsibility.

[PO-7] Communicate effectively.

[PO-8] Achieve broad education necessary to understand the impact of electrical engineering solutions in a global and societal context.

[PO-9] Understand learning processes, concepts of learning to learn, and engage in lifelong learning.

[PO-10] Achieve knowledge of contemporary issues.

[PO-11] Use techniques, skills, and computer-based tools for conducting experiments and carrying out designs.

**ABET Outcomes**

3a- ability to apply knowledge of mathematics, science, and engineering

3b- ability to design and conduct experiments, as well as to analyze and interpret data

3c- ability to design a system, component, or process to meet desired needs

3d- ability to function on multi-disciplinary teams

3e- ability to identify, formulate, and solve engineering problems

3f- understanding of professional and ethical responsibility

3g- ability to communicate effectively

3h- the broad education necessary to understand the impact of engineering solutions in a global and societal context

3i- recognition of the need for, and an ability to engage in life-long learning

3j- knowledge of contemporary issues

3k- ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

**Relationship between the Course Learning Outcomes and Program/ABET Outcomes**

The course learning outcomes map onto the program and ABET outcomes as depicted in the table below:

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