

ESE 315 Control System Design

MW 14:30-15:50
LGT ENGR LAB 154

Instructor: Ji Liu, 211 Light Engineering, ji.liu@stonybrook.edu

Required Text: *Feedback Control Systems*: Fifth Edition,
by Charles L. Phillips and John M. Parr, Prentice-Hall publ.

TENTATIVE COURSE OUTLINE:

Reading	Topics	Lectures
Chapter 1:	Introduction to Control Systems	Week 1
Appendix B:	Laplace Transforms definition of Laplace transform and inverse Laplace transform; examples of common transforms; properties and theorems	Weeks 1-2
Chapter 2: Sec. 1-3; 5-12	Mathematical models for physical systems circuits, mechanical systems, electromechanical systems transformers and gears, more examples	Weeks 2-4
Chapter 4:	System Responses to Inputs responses in time-domain and frequency domain; design specifications	Weeks 4-5
Chapter 5:	Closed-loop Systems stability; transient response and steady state response; sensitivity	Weeks 5-7
Chapter 6:	Stability Analysis history and notions of stability; Routh-Hurwitz criterion; roots of the characteristic equation	Weeks 8-9
Chapter 7:	Root-Locus Methods root-locus principles and methods; lead design; lag design; PID design	Weeks 9-10
Chapter 8:	Frequency Response Analysis Frequency responses; Bode diagrams; Nyquist Criterion	Weeks 11-13
Chapter 9:	Frequency Response Design gain compensation; lag and lead compensation; lag-lead compensation PID design and implementation	Weeks 14-15

Assignments and Exams:

- Problem sets will be assigned on an approximately every-other-week basis, and will include MATLAB-based exercises.
- Two or three problems will be selected “randomly” from each assignment for grading. Solutions for all problems will be provided to students.
- **NO LATE HOMEWORKS** will be accepted, *HOWEVER* each student’s lowest homework score will be dropped before course grades are computed.
- There will be 6 in-class quizzes held roughly every-other week; these will be announced the lecture prior to the quiz date (makeups only if prior notification of valid excuse provided).

Course Grade Composition:

Item	% of grade
Homework Problem Sets	20%
Quizzes	20% total
Midterm Exams	40% (20% each)
Final Exam	20%