

ECE 6550
Summer 2007
Course Description

Instructor: Professor Yorai Wardi

Synopsis: The course covers the foundations of linear systems theory, which constitutes the fundamental framework for modern control theory.

Text: W.L. Brogan, *Modern Control Theory*, Third Edition, Prentice Hall, New Jersey. Hand-outs will be given for material that is not covered in the text

Grading: Homework - 20%; Quiz 1 - 20%; Quiz 2 - 20%; Final exam - 40%

Detailed course description:

- Introduction to dynamical systems
- Review of ordinary differential equations
- Linearity and time invariance
- Time-invariant systems
- Linear systems and the state-transition matrix
- Linear, time-invariant (LTI) systems
- The matrix exponential and the state transition matrix
- Review of linear algebra
- Modes and stability
- Controllability and observability
- Pole placement via feedback
- Luenberger observers
- Optimal control and the LQR problem
- Minimum-time problems and the bang-bang control