Instructor: P.K.C. Wang  
Office: Rm.66 – 147L Engr.IV.

NO REQUIRED TEXT. Lecture Notes will be posted at the course web-site from time to time.


OUTLINE:

1. Introduction:
   Mathematical models of physical systems, examples.

2. Mathematical Models in the Form of Ordinary Differential Equations and Difference Equations:
   Solutions of linear ordinary differential and difference equations with constant coefficients.

3. Linear Algebra:
   Vector spaces, basis, linear transformations, representations of linear transformations with respect to a given basis, singular values, eigenvalues, and eigenvectors of linear transformations, simple linear transformations.

4. Linear Dynamic Systems:
   Systems of first-order ordinary differential and difference equations, linearization of system equations about a given motion, representations of linear differential and difference equations with respect to a given basis, state transition matrix.

5. Linear Time-Invariant Dynamic Systems:
   Matrix exponential and its computation, canonical forms of linear time-invariant systems, modal representation of linear time-invariant systems, dominant modes, stability, transfer functions.

6. Intrinsic Properties of Linear Time-Invariant Dynamic Systems:
   Controllability, observability, introduction to observers, feedback control, and stabilization.

7. Stability of Linear Systems.

REFERENCES:


EXAMS. & HOMEWORK: Midterm: 25%; Final: 45%; Homework: 20%; Mini-proj.:10%

Software: Matlab–The Mathworks, Inc. 20 North Main St. Suite 250, Sherborn, MA. 01770. (It may be accessed from SEASNET.)