EE 381 Systems & Control

Fall 2006 – Section 02

Instructor:

Asst. Prof. Dr. Afşar Saranlı
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Office Hours: To be announced

Lecture Hours:

Monday 13:40 - 15:30 IE-105 (Dept. of Ind. Eng.)
Wednesday 14:40 - 15:30 IE-102 (Dept. of Ind. Eng.)

Section Support Web Site:

http://netclass.ii.metu.edu.tr (Login with student account)

Other Section Instructors:

Prof. Dr. Kemal Leblebicioğlu (Section 01),
Prof. Dr. Önder Yüksel (Section 03),

Assistants:
To be announced.

Course Purpose:

The purpose of this course is to give a concise and working knowledge of basic theoretical tools from linear system and control theory. You will be introduced to methods to model and analyze dynamic systems which you may face in many areas of engineering. You will gain a introductory understanding of the concepts of state and the representation of a system in state-space. You will study a system's stability, observability and controllability. Hopefully by the end of this course, you will have enough understanding of the concepts to apply them to the problems you will face in your discipline.

Reference Materials:

* K. Ogata, "Modern Control Engineering", 3rd Ed. Prentice Hall, 1997
* E. Kocaoğlan, *Lecture Notes on Linear Control Systems*, METU
* C.L.Phillips, R.D.Harbor, *Feedback Control Systems*, Prentice-Hall
* Ö. Yüksel, *Introduction to Feedback Systems*, (Lecture presentations), METU

Tentative Schedule:

The course will be organized as follows:

1. Introduction (1 hr) (Text 2: I)

2. Transfer Functions (8 hrs) (Text 2: II)

a. Mathematical Models
b. Transfer Funtions and Block Diagram Represenatation
c. Block Diagram Simplification

3. Time-Domain Analysis (5 hrs) (Text 2: IV)

   a. Transient-Response
   b. Steady-State Error

4. Stability Analysis (8 hrs) (Text 2: V)

   a. by the Routh-Hurwitz Test
   b. by the Root-Locus Method

5. State-Space Represenatation and State Eqs. (6 hrs) (Text 2: III)

   a. State equations from transfer functions
   b. Canonical Forms
   c. Controllability and Observability

6. State Feedback (6 hrs) (Text 2: VI)

   a. Pole Placement
   b. Observer Design

Evaluation and Grading:

The course will have 2 midterms and a final as well as homework
assignments and short quizzes. The grading will be conducted as
follows:

- 1st midterm exam   %25
- 2nd midterm exam   %25
- Final exam   %40
- Homework, Quiz & Attendance   %10

Examinations are planned as closed book and notes and will emphasize
basic concepts and drill problem solving skills. Homework assignments
will be distributed from class web site and will be collected at the
beginning of the class on the due date and will not be accepted late.

Ethic Behavior:

You are considered as future professionals in engineering and highest
ethical standards are presumed. It is expected that each student will
present his/her own work. Disappointing behavior, if detected, will be
dealt with accordingly.