

**University of Illinois at Chicago**  
**Department of Mechanical and Industrial Engineering**  
**ME 412 - Dynamic Systems Analysis I**

**Instructor:** Professor Sabri Cetinkunt  
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Office Hours: M 12-4

**Textbook:** Feedback Control of Dynamic Systems, Franklin, G.F., Powell, J.D., Emami-Naeini, A., Addison-Wesley, 2002, Forth Edition. Earlier editions of the book is OK for the course.

**Additional Recommended Textbooks:**

Modern Control Systems, Dorf, R., Addison-Wesley, 1988.  
Modern Control Engineering, Ogata, K., Prentice Hall, 1990.  
Automatic Control Systems, Kuo, B., Prentice Hall, 1991.

**Prerequisite:** Strong interest in Computer Controlled Systems.

**Grading:** Exam 1 : 25%  
Exam 2 : 25%  
Final : 25%  
Homework: 25%

**Remarks:** No late homework accepted. Proficiency in at least one of the high level programming languages (C, Fortran, or MS-BASIC), and learn to use one of the CAD-tools for control system design and analysis (i.e. MATLAB student version). MATLAB is available in ME Undergraduate CAD lab (ERF 1014) and in all PCs in SEL 2249.

**Course Outline**

Topic	Chapter	# Lectures
Introduction to control systems	Ch. 1	1
Laplace transforms, partial fraction expansions	Lecture Notes	4
Mathematical modeling, linearization	Ch. 2	1
Block diagram model representation		2
Feedback control systems characteristics,	Ch. 3	2
Performance measures of feedback control systems		2
Stability: linear time invariant systems.	Ch. 3	2
Root locus method	Ch. 4	8
Frequency response methods	Ch. 5	10
Compensator design: PID, lead-lag compensator	Ch. 7	10
2 Exams		3