EE128/ME134 Feedback Control Systems, Fall 2015

Instructor: Prof. Ronald Fearing
Office Hours (725 Sutardja Dai Hall) M 2-3, W 11-12, or email ronf@eecs for appointment.

Teaching Assistants:
Ethan Schaler, eschaler@eecs.berkeley.edu, OH: Tu2-3, Th 2-3, 125 Cory Hall.
Kevin Haninger khaninger@berkeley.edu, OH: W 12-1, Th 12-1, 125 Cory Hall.

Course web page: http://www-inst.eecs.berkeley.edu/~ee128/ for handouts, homework, lecture notes.

Please use Piazza for class questions: https://piazza.com/class/id65ivtpk62lz

Text: N.S. Nise, *Control Systems Engineering,* 5th, 6th or 7th edition.
Recommended Software: MATLAB & Simulink Student Version 2010a or later. Check https://software.berkeley.edu/matlab for availability.

Grading: Homework: 15%, Lab 30%, Midterm 20%, Final 35%.

Homework: Homework is due Fri 5 pm in the homework box in first floor Cory. The lowest HW grade will be dropped. Up to 2 people may turn in a single homework writeup with both names listed.

Reader: TBA

Labs: Scheduled labs will be held in 125 Cory. Due to limited lab stations, groups of 3 (or 4 if needed) students will work together and electronically submit a single Prelab (due before lab) and a single Final Lab Report. For the first lab assignments you will be assigned a group within your assigned lab section. You must attend your assigned lab section. By arrangement only with GSIs, 2 students can request to swap sections with each other.

Section 101: M 3-6 pm,
Section 103: Tu 5-8 pm,
Section 102: W 1-4 pm,
Section 104: Fri 10-1pm
There are no discussion sections.

Honest and ethical conduct. All work submitted to the class must be your own or attributed. The penalty for unethical conduct on exams will a grade of F or NP and a letter will be written to the campus Office of Student Conduct. The penalty for unethical conduct on homework or labs will be a -100% grade on that assignment.

EE128/ME134 Course Schedule (draft 8/12/2015)
[please see class web page for updates]

Wk #	Lec #	Date	Lecture	Reading	PS	Lab
1	1	Thu 8/27	Overview, intro. to FB control, dynamic models slides	Ch. 1.	HW1 due 9/4	no lab
2	2	Tue 9/1	Modeling in the frequency domain slides	Ch. 2.	HW 2 due 9/11	no lab
2	3	Thu 9/3	Modeling in the time domain slides	Ch. 3.		no lab
3	4	Tue 9/8	Modeling in the time domain	App. G.	HW3 due 9/18	Lab 1: Modeling Simulation in MATLAB / Simulink
3	5	Thu 9/10	Time response slides	Ch. 4		Lab 1
4	6	Tu 9/15	Time response	App. J.	HW4 due 9/25	Lab 2: Basic concepts in control system design
4	7	Thu 9/17	Stability slides	Ch. 6		Lab 2
5	8	Tue 9/22	Steady state errors slides	Ch. 7	HW5 due 10/2	no lab
5	9	Thu 9/24	Steady state errors			no lab
6	10	Tue 9/29	Root locus techniques slides , AppM , Rule List	Ch. 8	HW6 due 10/9	Lab 3: Quanser hardware & proportional control
6	11	Thu 10/1	Design via root locus slides	Ch. 9		Lab 3
7	12	Tue 10/6	Frequency response techniques slides	Ch. 10	HW 7 due 10/16	Lab 4: Model-based position control of a cart
7	13	Thu 10/8	Frequency response techniques			Lab 4
8	14	Tue 10/13	Frequency response techniques			Lab 5a Magnetic levitation
8	15	Thu 10/15	midterm review			Lab 5a
9	16	Tue 10/20	Tentative Midterm : HW1-7, lec 1-14, Ch 1-10, lab 1-4		HW8 due 10/30	no lab
9	17	Thu 10/22	Design via frequency response slides	Ch. 11		no lab
10	18	Tue 10/27	Design via frequency response		HW9 due 11/6	Lab 5b: Magnetic levitation
10	19	Thu 10/29	Design via state space slides controllability (v3) notes	Ch. 12 Ch. 5.7, 5.8		Lab 5b:
11	20	Tue 11/3	Design via state space		HW10 due 11/13	Lab 6a:Pole placement for the inverted pendulum
11	21	Thu 11/5	Design via state space (Observer)			Lab 6a:
12	22	Tue 11/10	Design via state space (integral control, separability)		HW 11 due 11/20	Lab 6b: Luenberger observer design for inverted pendulum
12	23	Thu 11/12	LQR Design LQR notes			Lab 6b:
13	24	Tue 11/17	Digital control slides DT notes	Ch. 13	HW 12 due 12/4	Lab 6c: LQR controller design for inverted pendulum
13	25	Thu 11/19	Digital control systems slides	Ch. 13		Lab 6c:
14	26	Tue 11/24	Digital control systems slides			no lab
		Thu 11/26	Thanksgiving Holiday			no lab
15	27	Tue 12/1	control with vision systems. Dynamic effects in visual closed-loop systems.	Corke&Good TRA 1996		Lab 6d: Self-erecting inverted pendulum
15	28	Thu 12/3	Course wrap up and review Fall 2011 Final and (sol)			Lab 6d
16		Tue12/8	**RRR Week**, No Lecture			no lab
16		Thu 12/9	**RRR Week**, No Lecture			
17		Fri 12/18	**Final Exam is Friday 12/18 7-10 pm** Sp15 sol			