

EECS192 Mechatronic Design Laboratory- Spring 2012

Instructor: Prof. R. Fearing, Office 725 Sutardja Dai Hall, x2-9193.

Office Hours: Tue 3-4, Wed 1-2

Please email for an appointment at another time (ronf@eecs.berkeley.edu).

TA: John Wang, johnjwang@berkeley.edu. Office hours (tent) Tu 1230-2, W 2-3 in 204 Cory.

Class meeting: Tue 11-1230 pm 293 Cory Hall.

Lab lecture/demo TBA 204 Cory Hall. Checkoffs tentatively Fridays, 130-230 pm. At least one team member must be present to demonstrate functionality.

Grading: 18% checkoffs, 20% final exam, 18% oral and written reports, 5% written assignments, 10% first round contest, 20% second round contest, 4% community spirit, 5% in class 10 minute quizzes.

Recommended Texts: (on reserve in Engineering Library) *Mechatronics: mechanical system interfacing* by D.M. Auslander; *Analytical robotics and mechatronics* by W. Stadler; *Robotic engineering: an integrated approach* by R.D. Klafter; *The Art of Electronics* by Horowitz and Hill;

Suggested reference: *Introduction to Mechatronic Design* by J.E. Carryer, R.M. Ohlne, and T.W. Kenny. Please check the class web page: www-inst.eecs.berkeley.edu/~ee192 for class handouts and pointers to data sheets, etc. Also, announcements and discussion will be on piazza.

lecture	Lecture and Demo Topics	Project Checkpoint
1/17	proj. description, ADuC7020 overview, peripheral interface Demo: soldering I, ADuC7020, car	team formation
1/24	motors, motor control, ADuC7020 IO electronic construction practices Demo: soldering II, μ Vision 3, SolidWorks, test equipment	Hello World, LED blink
1/31	PWM, H Bridge, power MOSFET Demo: RC servo, motor circuit and waveforms	written project proposal Fri. Feb. 3 car clean and checked
2/7	RC servo, AD7020 PWM, Power Supply I Demo: power tools, power supply waveforms	CPU turns motor on/off (on bench - stalled) CPU turns front wheel left/right
2/14	Power Supply II Demo: power filtering	drive motor from battery PCB #1 due 2/17
2/21	optical encoder, magnetic sensor, A/D Demo: quadrature encoders, EM field sensing	CPU board, stalled motor and RC servo from battery
2/28	analog design, line sense intro Demo: band pass filters, detectors	drop and run test, open loop Figure 8 (PCB on car) w/e-stop lab clean
3/6	line sensing conc., velocity control Demo: A/D, noise/shielding	bench top line following, drop and run
3/13	steering control Demo: proportional, PI velocity/steering control	closed loop Figure 8 line following I, drop and run outside track setup optional PCB #2 due 3/17
3/20	steering and feedforward control demo: step response	velocity control, Figure 8 (> 1 m/sec), sensor mech. response, lab clean Progress report due Fri. Mar. 23
3/27	Spring Break	Spring Break
4/3	discrete time control and filtering Demo: speed adaptation	practice course and step response Assignment #1 due Fri. 4/6
4/10	HW and SW robustness	Round 1: Mon 4/9
4/17	Mechatronic system examples I	Cal Day Sat. 4/21
4/24	Mechatronic system examples II	Round 2: Mon 4/23, lab clean
4/26, 4/27	Student Oral Reports	
5/1	optional Final Review	
5/10	final exam Thu. May 10, 8-11 am	
5/25	(Fri.) optional NATCAR contest (UC Davis) 12-4 pm	