Course Information - Updated February 22, 2005

Instructor	Kannan Ramchandran, 257 Cory, `kannanr@eecs.berkeley.edu`, OH Mon 1:30-3pm
GSI	Niels Hoven, OH Tu 2:30-3:30pm, 197 Cory, `nielsgsi@gmail.com` Hari Palaiyanur, OH Wed 1-2pm, 197 Cory, `harigsi@gmail.com`
Lecture	Mondays and Wednesdays, 10-12 PM, 277 Cory
Grading	Quiz (5%), HW (20%), Midterm (30%), Final Exam (45%) The quizzes are tentatively scheduled for in class on February 16 and April 13. The midterm will be on the evening of March 16.
Prerequisites	EECS 20 (absolute must) and Math 53 and 54.
Required Texts	A. V. Oppenheim and A. V. Willsky with S. Nawab, *Signals and Systems.* Prentice Hall. Second Edition. D. Hanselmann and B. Littlefield, *Mastering Matlab 7.* Upper Saddle River: Prentice Hall, 2004.
Homework	Homework will be posted typically on Wednesday or Thursday, and will be due the following Thursday at 11:30am. *Late homework will not be accepted.* Instead, the worst homework grade will be discarded.
Homework Regrades	The only way to get your homework regraded is by handing it back to the GSI *with a written explanation* why you feel we did not give you enough credit. We will then regrade your *entire* homework set, not just the contested problem.
Sections	Section 101: M 4-5pm, 3102 Etcheverry Section 102: M 3-4pm, 299 Cory Section 103: W 3-4pm, 3113 Etcheverry Section 104: W 9-10am, 289 Cory Note: You may attend any or all of the sections.
Web	`http://inst.eecs.berkeley.edu/~ee120`
Newsgroup	`ucb.class.ee120`
Additional Reference	E. A. Lee and P. Varaiya, *Structure and Interpretation of Signals and Systems.* Addison-Wesley, 2003. (This is the EECS 20 textbook.) Lathi, B.P., *Linear Systems and Signals.* Oxford, 2001. (Excellent coverage of linear differential equations.) Lathi, B.P., *Signal Processing and Linear Systems.* Addison-Wesley, 1998. (Based on the above book, with additional applications.)

Course Goals and Outline

This is one of the key courses, teaching you how the mathematics you have learned earlier is actually useful to understand signals and systems. The course will build on EECS 20 and will help give you the tools and understanding you will need to get to senior/grad level classes like 121, 123, 125, 128, 192, 221A, 224, and 226A). EECS 126 (Probability and Random Processes) is not required for this course and gives a complementary set of tools needed for advanced material, especially in the areas of communications and signal processing. We assume that you have familiarity with lower division physics and circuits since these are the source of many examples.

1. Signals and Systems: Basic Properties
2. LTI Systems in the time domain, convolution
3. Fourier Representations
4. LTI Systems in the frequency domain
5. Sampling
6. Communication Systems. Modulation/Demodulation. PAM, QAM, PSK, Equalization.
7. Control Systems. Unstable Systems, Laplace and Z-Transforms, Pole/Zero Analysis, Feedback.
8. Signal Processing. Filter design, aliasing, windowing, interpolation, FFT.

Matlab

Most assignments will involve numerical exercises using matlab. Please turn in any graphs you are asked to plot. It is strongly recommended that you not do the matlab exercises at the last minute, so that you will not be at the mercy of circumstances beyond your control, e.g., a printer breakdown.

The supplementary text *Mastering Matlab 7* is a good tutorial and reference on matlab, and you will find it especially useful if you have never used matlab before. If you have used matlab previously, you probably do not need to buy this book. This book does not discuss in detail a few of the specialized matlab functions used in this class, but you can find out all you need to know by using matlab's built-in help function.

The assigned exercises can be done on any computer running Matlab. No multimedia capability is required. Three options are available for running matlab:

1. Run matlab on the EECS instructional Unix system. You can log in to the Unix systems using the terminals in 199 Cory. Alternatively, you can access these Unix systems from any computer at home or on campus using `ssh` over the Internet. About two thirds of the students in the class already have Unix accounts. Students who do not have Unix accounts can request them by logging in as username `newacct`, password `newacct`, in 199 Cory, or over the Internet via `ssh` to `cory.eecs.berkeley.edu`. Your Unix account will not expire at the end of the semester. For information, refer to `http://inst.eecs.berkeley.edu/connecting.html`.

2. Run matlab on the EECS instructional Windows systems. By the end of the first week of classes, the EECS Instructional and Electronics Support Group will set up Windows accounts for all students in the class (including those on the waiting list). A list of user names will be posted at the class news group, `ucb.class.ee120`. The initial password will be you student identification number. Your windows account will expire at the end of the semester. You can use any of the Windows systems listed at: `http://inst.eecs.berkeley.edu/~iesg/iesglabs.html`.

3. Buy the student version of Matlab, along with the Control and Signal Processing Toolboxes.