# Course Information

| | |
|---|---|
| Instructor | Michael Gastpar, 253MC Cory, `gastpar@eecs.berkeley.edu`, OH T 2-3 W 11-12 |
| GSI | Alex Dimakis, OH TBA, `alex_ee120@yahoo.com`<br>Bobak Nazer, OH TBA, `bobakgsi@yahoo.com` |
| Lecture | Mondays and Wednesdays, 4-6 PM, 277 Cory Hall |
| Grading | HW (20%), Two Midterms (40%), Final Exam (40%)<br>The midterm exams will be in class, and you should expect them around early March and early April.<br>Exams are closed-book and closed-notes; calculators, computing and communication devices are *not* permitted. However, one handwritten and *not photocopied* double-sided sheet of notes is allowed for the first midterm, two for the second midterm, and three for the final exam. |
| Prerequisites | EECS 20 (absolute must) and Math 53 and 54. |
| Required Texts | E. A. Lee and P. Varaiya, *Structure and Interpretation of Signals and Systems.* Addison-Wesley, 2003. (This is the EECS 20 textbook.)<br>A. V. Oppenheim and A. V. Willsky with S. Nawab, *Signals and Systems.* Prentice Hall. Second Edition. |
| Homework | Homework will be assigned typically on Thursday or Friday, and will be due ten days later on Monday at 9:30am. *Late homework will not be accepted.* Instead, the worst homework grade will be discarded. There will be $n$ homework sets ($n \approx 12$), each worth 100 Points. The maximum possible total homework score, including all extra credit, is $(n-1)100$.<br>A group of up to three students may work together and turn in a single homework assignment bearing all their names, for which they will earn a common grade. |
| Sections | Section 101: M 10-11A, 293 Cory<br>Section 102: T 3-4P, 247 Cory<br>Section 103: W 3-4P, 289 Cory<br>Section 104: Th 10-11A, 241 Cory<br>Note: You may attend any or all of the sections. |
| Web | `http://inst.eecs.berkeley.edu/~ee120` |
| Newsgroup | `ucb.class.ee120` |
| Additional Reference | A. V. Oppenheim and A. V. Willsky with S. Nawab, *Signals and Systems.* Prentice Hall. Second Edition.<br>D. Hanselmann and B. Littlefield, *Mastering Matlab 6.* Upper Saddle River: Prentice Hall, 1998. |

## 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

About 25 % of the homework will involve numerical exercises using matlab. Please turn in any graphs you are asked to plot, along with listings of your matlab scripts. 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 optional supplementary text *Mastering Matlab 6* 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 6. 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 6, along with the Control and Signal Processing Toolboxes.