
University of New Mexico, Albuquerque
Department of Electrical and Computer Engineering
ECE-314: Signals and Systems
Fall Semester 2009, 3 Credit Hours

COURSE INFORMATION:

Course Instructor	Prof. Balu Santhanam
Office Location	Room 326A, ECE Bldg.
Contact Info	Email: bsanthan@ece.unm.edu Tel: (505) 277-1611 , Fax: (505) 277-1439
Prerequisite	ECE-213 and Math 264.
Location	ECE-132
Lectures	TR: 2:00 - 3:15 PM
Textbook	Simon Haykin and Barry Van Veen, "Signals and Systems," Second Edition, John Wiley and Sons, 2003.
Office Hours	TBA
TA	TBA
Contact Info	TBA

GRADING SCHEME:

Weekly Quizzes: 10%
Computer Projects : 10%
Midterm 1 : 25%
Midterm 2 : 25%
Final Exam : 30%, Tue, Dec. 15, 10:00 - 12:00 AM

REFERENCES:

- Leslie Balmer, "Signals and Systems An Introduction", Prentice Hall Inc., New York, 1997.
- M. J. Roberts, "Signals and Systems: Analysis Using Transform Methods and MATLAB," McGraw Hill Publications, New York, 2004.
- F. G. Stremmer, "Introduction to Communication Systems," Third Edition, Addison-Wesley Inc, New York, 1990.
- A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and Systems," Second Edition, Prentice Hall Inc., New Jersey, 1997.
- J. R. Buck, M. M. Daniel, and A. C. Singer, "Computer Explorations in Signals and Systems Using MATLAB," Second Edition, Prentice Hall, New Jersey, 2002.

CONCEPTUAL OVERVIEW:

The range of topics that will be covered in this course are:

- **Properties and Classifications of Signals and Systems** : properties of signals and systems, classification of signals and systems, linear time-invariant (LTI) systems, differential/difference equation based system representation of LTI systems, dirac impulse function, Kroneker Delta function, sifting theorem.
- **LTI systems : The convolution Operation** : convolution integrals/sums and properties, evaluation of the convolution Integral/sum, system impulse and step responses, correlation and autocorrelation of signals.
- **Fourier series and Fourier Transform**: Fourier series representation of periodic signals and properties, LTI systems with periodic input, Fourier Transform and properties, frequency response and Fourier analysis of LTI systems, Bode plots, discrete time Fourier transform, discrete Fourier transform.
- **Laplace Transform and System Analysis** : Bilateral Laplace transforms and properties, region of convergence, inverse Laplace transform, system analysis via the Laplace transform, block diagrams for LTI systems, feedback and applications of feedback.
- **Nyquist Sampling Theorem and Reconstruction**: Critical sampling, over and under sampling, aliasing, reconstruction from samples, decimation, interpolation, zero-order and higher-order hold.
- **Z-transform and Discrete-time System Analysis**: Bilateral Z-transform and properties, region of convergence, inverse Z transform, system functions, signal flow graphs.
- **Amplitude Modulation** double side band AM, single sideband AM, large carrier AM, pulse amplitude and position modulation, basics of AM demodulation.

Additional Information

Course Webpage

The webpage for the course is located at www.eece.unm.edu/faculty/bsanthan under ECE-314. Information regarding homework, homework solutions, MATLAB assignments, MATLAB resources, problem sessions etc, will be posted here so please check there often.

Library and Computer Resources

There will be a folder for ECE-314 at the *centennial science and engineering library* (CSEL) reserve desk. I will also be putting some of the reference material on reserve so that they can be checked out for a limited period of 2 hours. In regards to the computing resources, you should obtain a ECE computer account if you do not already have one. There is an online application form that you need to fill in and submit once you are in the ECE network this will give you access to the ECE Unix and Windows machines that have MATLAB 7.x loaded on them. These will come in handy during the MATLAB computer assignments.

Exams and Tests

The midterm exam and the final exam for the course will be in-class type exams. These exams are closed-book, closed-notes, mode exams. The final exam will be a comprehensive test that will cover the whole syllabus. You will be allowed a sheet of formulae for each midterm exam that you can carry into the final. Please note that **I do not entertain students taking the exam out of order, i.e., neither before or after the exam date** unless it is really extraneous circumstances (health reasons). I will have review sessions for the midterms and the final exam to overview what is expected out of you. The venue and timing for these sessions will be posted to the course webpage under the announcements section.

Policies and Assumptions

Homework and Office Hours

Homework assignments are meant to strengthen your conceptual understanding in the course. They are not intended to be a masochistic ritual. I also recommend that you use my office hours and the office hours of the TA properly and judiciously. Computer assignment or projects will be assigned in MATLAB to augment the material discussed in class.

Attendance Policy

It is assumed that the students are aware of and understand the university attendance policy. Weekly quizzes will be given in the to overview the material done in the class. These quizzes will count towards the final grade in the class. In any case if you do not attend class, honestly I don't care, because you are assumed to be adults and it is your money going down the drain.

Make-up Exam Policy

I do not give make-up exams. If you need to take the exam ahead of time then it is **your responsibility** to arrange a alternative date/time with me and this will be only under extraneous circumstances.

Exam Regrade Policy

Questions regarding grading in the midterms and the final exam need to be addressed within 1 day of the return of the graded exams. Note further that partial credit assignment remains at the discretion of the instructor and is not subject of debate.

Cheating and Academic Honesty

It is also assumed that you are familiar with the university academic honesty policy. Needless to say that copying and dishonesty will be dealt with seriously and appropriately.

Prerequisites

ECE-213 (Circuits II), Math-264 (Differential Eq's) are currently listed as pre-requisites. A working knowledge of MATLAB would help but is not necessary. You are expected to have a working knowledge of the Laplace transform and convolution from ECE-213 and the ability to analytically solve a second-order constant-coefficient differential equation. Students who find their knowledge of the pre-requisites for the class, deficient, are urged to attend the recitation hours for the class.