ENEE 322: Signal and System Theory
Course Information
Fall 2004

General Information

• Course Information:
  Title: ENEE 322: Signal and System Theory
  Lecture: TuTh 9:30 – 10:45, Chm 128
  Recitation: Section 0101 Mon 11:00 - 11:50 EGR 2112
  Section 0102 Mon 8:00 - 8:50 EGL 1202
  Mailing List: enee322-01all-fall04@coursemail.umd.edu

• Instructor Information
  Instructor: Dr. Jerome A. Gansman
  Office: 1419 A.V. Williams Building
  Phone: 301–405–3685
  Email: drgans2004@comcast.net
  Office Hours: TuTh 8:30am – 9:15am
  Wed 6:00pm – 7:00pm
  Additional hours by appointment

• Teaching Assistant Information
  TA: Shan He
  Office: EGL 1153
  Phone: TBA
  Email: shanhe@Glue.umd.edu
  Office Hours: Wed 2:00pm - 3:00pm
  Fri 9:50am - 10:50am

• Prerequisites:
  – ENEE 204: Basic Circuit Theory
  – MATH 246: Differential Equations for Scientists and Engineers
  – Completion of all lower-division technical courses in the curriculum

• Textbook:
  – Alan V. Oppenheim and Alan S. Willsky,
Course Objectives

1. Understand how a linear time invariant system operates on inputs to produce an output
2. Determine responses of linear systems to different inputs under different initial conditions, using different methods (differential and difference equations, Laplace and Z-transforms, convolution, state space methods)
3. Understand the concept of signal spectrum (Fourier series, Fourier transform)
4. Understand relationship between time domain properties of a signal and frequency domain features in its spectrum
5. Understand how the input spectrum, output spectrum and frequency response of a linear system are related

Topics Covered

1. Linear Time-invariant systems: convolution integral for continuous-time systems; convolution sum for discrete-time systems; properties of linear time-invariant systems; systems described by differential and difference equations.
2. Fourier Series Representation of Periodic Signals: sinusoidal steady-state response; representation of periodic signals by trigonometric series; properties of continuous-time Fourier series; discrete-time Fourier series and its properties; continuous and discrete-time filtering.
3. The Continuous-time Fourier Transform: definition of the Fourier transform and its inverse; properties of the transform; common transform pairs; convolution and multiplication theorems.
4. The Discrete-Time Fourier Transform: definition and properties; convolution theorem; frequency response corresponding to difference equations.
5. Sampling: uniform sampling; sampling theorem; aliasing; decimation; interpolation.
6. Laplace Transform; definition; region of convergence; properties; analysis of LTI systems; solution of differential equations.
7. The z-Transform; definition; region of convergence; inversion; basic properties; solution of difference equations.

References

Recitations

- During recitations your TA will go over solutions to select homework problems. In addition, recitations provide you with an opportunity to ask clarifying questions regarding material or concepts presented in lecture.
- The style of the recitations will be rather interactive, so your participation is both encouraged and important.

Homework and Quizzes

- There will be approximately 12 homework assignments during the semester. They will be collected, graded, and returned to you along with a copy of the solution. Homework is due at the beginning of class on the date indicated. No late homework will be accepted for any reason.
- It is important that you do the homework in order to understand the material in the course. While it is perfectly reasonable to discuss your approach to solving the problems with a friend, the final writeup of the solution should be your own work and not a copy of your friend's solution.
- From time to time throughout the semester I may give some short in class quizzes.
- In each homework assignment, there will be a section of “Additional Problems”. These problems will not be graded and should not be submitted with your solution. However, you should work through these problems. You are responsible for them on tests.
- Typically graded homeworks will be returned one week after they are collected. The last homework assignment collected before a test might not be returned before the exam date. Therefore, you should retain a photocopy of your homework solution to study for the test.

Examinations and Grading

- There will be two in-class exams and one comprehensive final exam
  - Thursday, Oct. 07, In class
  - Thursday, Nov. 18, In class
  - Tuesday, Dec. 14, 8:00 am – 10:00 am

  All exams will be closed book, closed note, and without a calculator. The exact material to be covered on each exam will be announced about one week before the exam date.
- Your grade will be determined by the following weighted combination:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeworks &amp; Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Test 1</td>
<td>25%</td>
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<tr>
<td>Test 2</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
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<tr>
<td></td>
<td>100%</td>
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</tbody>
</table>
• **No makeup exams will be given for any reason.** If you need to miss an exam, you must get permission from Professor Gansman before the exam, and the final exam will count for that portion of your grade.

• If you dispute your grade on any homework or exam, you have **one week** from the date the paper was returned to request a change in the grade. After this time, no change in grade will be considered. All requests for a change in grade must be submitted **in writing** to Professor Gansman.

• The University has no policy on the number of final exams a student can take in one day. Students are strongly encouraged to check the final exam schedule before registering for courses.

### Web based learning tools

• A course web page ([http://www.ece.umd.edu/courses/enee322-1.F2004/](http://www.ece.umd.edu/courses/enee322-1.F2004/)) will contain information and handouts. Check this site often for important announcements. I will not keep extra copies of course handouts. If you miss class, you will need to get any missed handouts from the web page.

• I will post important announcements, homework clarifications, and other miscellaneous information to the course mailing list, **enee322-01all-fall04@coursemail.umd.edu**

### Recommended Study Habits

• Read the specified sections of the book before class.

• Attend lecture and take written notes.

• After lecture recopy your notes and study the reading assignment.

• Start on the homework problems early and take advantage of office hours.

• **Do not fall behind!**

### Disabilities

Any student who has a disability should contact Professor Gansman at his/her earliest convenience.