George Mason University  
Electrical and Computer Engineering Department  
ECE 220: Signals and Systems I  
Syllabus  
Spring 2014

Professor: Dr. Kathleen E. Wage  
Nguyen Engr. Bldg., Room 3217  
703-993-1579  
kwage@gmu.edu  

Class: Tues./Thurs. 10:30-11:45am  
Enterprise, Rm 178  

Office hours: Monday 3:30pm-5pm  
Wednesday 4-5pm  
other times by appointment

Prerequisites: Grade of C or better in ECE 201

Corequisites: MATH 203 and MATH 214

Required Texts:


Other Required Materials: i>clicker (version 1, 2, or +); http://www.iclicker.com

Course Webpage: http://ece.gmu.edu/~kwage/courses/ece220/spr14

Recitation TA: Najmeh Nejati  
Laboratory TA: Meena Arukala

Course Objectives

- Introduce students to the basic types of signals and systems encountered in engineering and to important properties of these systems.

- Introduce students to methods of characterizing and analyzing continuous-time signals and systems in the time and frequency domains.

The workload for this course consists of the following: two class meetings, one recitation, and one laboratory session per week. Class time is divided between short lecture segments on key concepts and in-class group exercises. Students are expected to do the assigned reading prior to coming to class so that they are adequately prepared to participate in the interactive problem-solving sessions. The course grade is based on performance on the in-class problems, weekly homework assignments, laboratory projects, two in-class examinations, and a comprehensive final examination. The remainder of this handout describes the course requirements in more detail.

Prerequisites and Corequisites

The prerequisite for this course is a C or better in ECE 201. In addition, two math courses (MATH 203 and MATH 214) are corequisites. You are assumed to be familiar with the Matlab software package, which you used in ECE 201. Most importantly, I will assume that you have an interest in and a commitment to developing a deep understanding of signals and systems concepts. The material that we will study in this course...
provides important foundations for all upper level courses in communications, signal processing, and control. A lack of effort in ECE 220 will almost certainly result in substantial difficulties in higher level courses.

Class Meetings
Class will meet Tuesdays and Thursdays in Enterprise, Room 178 from 10:30am to 11:45am. It is assumed that you will attend all of the classes, though attendance will not be formally recorded. If missing a class is absolutely unavoidable, you should check with your classmates to obtain the notes for that day and check the website to obtain any handouts. If homework is due, you are responsible for turning it in prior to class time.

Class meetings will combine short lectures on key points in the material with collaborative problem solving sessions. I feel that the time spent on the problems is much more educational than watching me lecture for the entire period. Responses to in-class problems will be submitted via i>clicker. More information about i>clicker use can be found below. The shortened lecture puts a responsibility on you to be prepared for class by completing the reading the night before. In my experience, students who come prepared to this type of class find that they understand more about the material and homework problems than if they had attended a traditional lecture. Students who are not prepared are more lost and confused than they are in traditional classes. Homeworks and exams may include topics that are in the reading but not covered in lecture, so again, it is important to keep up with the reading to do well in the course.

Cell phones, pagers, and other communicative devices are not allowed in this class. Please keep them stowed away and out of sight. Laptops or tablets (e.g., iPads) may be permitted for the purpose of taking notes only, but you must submit a request via email to do so. Engaging in activities not related to the course (e.g., gaming, email, chat, etc.) will result in a significant deduction in your in-class problem grade.

Preparation for Class
You are required to come to class prepared. As you progress in your career as an engineer, it is essential that you acquire the skill of reading a book to learn necessary information about a technical problem. In your professional life, you will have to solve many problems that are not taught in classes here, and engineering textbooks or journals will be your only resource. This course will provide an opportunity for you to develop your technical reading skills. Note that the lecture schedule has a complete list of reading assignments for the semester. The homework assignment may provide additional guidance about how to prepare for the following week’s classes.

i>clickers
This course will use i>clickers, a classroom response system, to facilitate the in-class problems. The i>clicker system provides immediate feedback about overall class understanding, which can lead to class discussion to clarify misconceptions and common mistakes. You are expected to purchase, or have purchased, an i>clicker device for use in this course. The devices that you can choose from include i>clicker, i>clicker+, and i>clicker2. To learn about each of these devices, please visit the i>clicker website at http://www.iclicker.com. You must register your i>clicker device online at http://www.iclicker.com/support/registeryourclicker/

Important information when registering your i>clicker:

- GMU uses a Learning Management System (Blackboard).
- Your student ID is the prefix of your email address.

Guidelines for i>clicker use:

- You must register your i>clicker in order to use it in this course.
- You must bring your i>clicker to every class. If you do not bring your i>clicker to class, you will not receive credit for in-class exercises during that class session.
• You may use only your i-clicker and no one else’s. If you are caught using more than one i-clicker, all of them will be confiscated for the duration of class, and you will receive a 0 for all in-class exercises. Only your i-clicker will be returned at the end of class.

Homework
There will be regular homework assignments (problem sets). These will be distributed via the course website (http://ece.gmu.edu/~kwage/ece220/spr14). You are expected to do ALL the assigned problems. In making up the exams and in assigning a final grade, I will assume that you have worked ALL the problems. Most exams will include one problem very similar to one of the homework problems. Thus, there will be a very immediate benefit to doing the homework completely and diligently. Each homework will also include the reading to prepare for the following week’s classes. Again, you are required to do this reading before the class meets. **Homeworks must be handed in at the beginning of the class on the day they are due. Late homeworks will not be accepted, as this would prevent prompt posting of the solutions.** Note that at the end of the term, I will drop the lowest homework grade from your overall homework score. Additional guidelines for the homework are posted on the website.

Recitation
There will be one 50-minute recitation per week led by a teaching assistant. The recitation session will include additional examples designed to enhance your understanding of the material covered in class. Extensions of material covered in class may also be presented in recitation. Attendance is expected, and you will be responsible for all material covered in recitation. Additionally, homework assignments will be returned in the recitation sections.

Laboratory
There will be a series of six or seven Matlab assignments to be completed in the laboratory. The laboratory assignments are a required component of the course. **Failure to complete all the lab assignments will result in a failing grade for the course.** Like the homework, Matlab projects must be handed in at the beginning of the lab in which they are due.

Office Hours
Office hours are a time for you to get help with homework, help in understanding the assigned reading, or answers to any other questions about ECE 220 material or the ECE program. Please take advantage of office hours! See the course webpage for a complete listing of office hours.

Exams
There will be two in-class exams during the semester and one comprehensive final exam during exam week.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>Thursday, February 20, 2014</td>
<td>10:30-11:45am</td>
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<tr>
<td>Exam 2</td>
<td>Thursday, April 3, 2014</td>
<td>10:30-11:45am</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Tuesday, May 13, 2014</td>
<td>10:30am-1:15pm</td>
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</tbody>
</table>

These exams will be given in the usual classroom. As noted above, it is likely that most of the exams will include a problem which is very similar to one of the homework problems. All of the exams are closed book and calculators and notes will not be allowed.

Course Grade
The final grade in the course is based on my best assessment of your understanding of the material and participation during the semester. The exams, problem sets, and projects are combined with the following rough weighting to give a preliminary final grade:
Exam 1 20%
Exam 2 20%
Final Exam 25%
Laboratory Grade 20%
Homework 10% (lowest score will be dropped)
In-class problems 5% (lowest score will be dropped)

A student requesting a grade change for any assignment must provide the instructor with the following within 2 class periods after the work is returned: the assignment and a paragraph describing why you feel you should receive additional points for the work. Note that in some cases, it is possible that what you wrote for the assignment indicated a better understanding of the problem than you actually possess. If the paragraph you submit indicates that you don’t understand the problem as well as the grader thought you did, then your score may be reduced.

Academic Integrity
GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. All ECE 220 students are expected to abide by the George Mason University Honor Code and the rules outlined below. Any reasonable suspicion of an honor code violation will be reported.

Three fundamental principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, factual information, graphs or figures from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Note that paraphrased material must also be cited. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

You will be working as a group during all the in-class interactive problem-solving sessions. You are also encouraged to collaborate on the homework assignments. Talking to other students, explaining your ideas and questioning their ideas, is a great way to learn. However, you must write up your own solution for the homework problems. In doing this, you MUST identify at the top of the assignment any students you collaborated with to complete the assignment. In signing your own name to the assignment, you are certifying that the work reflects your own understanding of the problems. Simply copying someone else’s answer is not working collaboratively, and is not permitted.

The same rules that apply to homeworks also apply to the Matlab assignments. Moderate discussion of ideas on the projects is permitted, but copying code or lab reports is explicitly forbidden.

The examinations are strictly your own effort, and I will be looking for consistency between the homework performance and the exam performance on those exam problems closely related to the problem sets.

Reposting of Course Material to Other Websites
The course materials (lecture notes, homeworks, projects, exams, solutions, and anything else posted on the course website) are copyrighted. You may not upload them to any other website or share them with any on-line or off-line test bank.

GMU Email Accounts
Students must use their Mason email account, either the existing MEMO system or a new MASONLIVE account to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.
Office of Disability Services
If you are a student with a disability and you need academic accommodations, please see the professor and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. http://ods.gmu.edu

Other Useful Campus Resources:

- WRITING CENTER: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
- UNIVERSITY LIBRARIES Ask a Librarian http://library.gmu.edu/mudge/IM/IMRef.html
- COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380; http://caps.gmu.edu
- UNIVERSITY POLICIES The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at http://universitypolicy.gmu.edu/. All members of the university community are responsible for knowing and following established policies.
<table>
<thead>
<tr>
<th>Lec#</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Reading</th>
<th>Out</th>
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<td>1</td>
<td>T 1/21</td>
<td>Introduction &amp; brief background review</td>
<td>O/W 1.0-1.1, p. 71</td>
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<td>2</td>
<td>R 1/23</td>
<td>Basic signals &amp; signal operations</td>
<td>O/W 1.2-1.4</td>
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<td>3</td>
<td>T 1/28</td>
<td>System properties</td>
<td>O/W 1.5-1.7</td>
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<td>4</td>
<td>R 1/30</td>
<td>LTI systems and the convolution integral</td>
<td>O/W 2.0, 2.2</td>
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<td>5</td>
<td>T 2/4</td>
<td>Graphical convolution</td>
<td>O/W 2.0, 2.2</td>
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<td>2</td>
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<td>6</td>
<td>R 2/6</td>
<td>LTI system properties</td>
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<td>7</td>
<td>T 2/11</td>
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<td>8</td>
<td>R 2/13</td>
<td>Singularity functions</td>
<td>O/W 2.5-2.6</td>
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<td>9</td>
<td>T 2/18</td>
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<td>O/W 3.0-3.2</td>
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<td>10</td>
<td>R 2/20</td>
<td><strong>Exam 1: covers material through 2/13</strong></td>
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<td>11</td>
<td>T 2/25</td>
<td>Laplace transform</td>
<td>A/S 15.1-15.2</td>
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<td>12</td>
<td>R 2/27</td>
<td>Laplace transform properties</td>
<td>A/S 15.3</td>
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<td>13</td>
<td>T 3/4</td>
<td>Inverse Laplace transform</td>
<td>A/S 15.4</td>
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<td>14</td>
<td>R 3/6</td>
<td>Problem-solving with Laplace</td>
<td>A/S 15.5</td>
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<td></td>
<td>R 3/11</td>
<td><strong>Spring Break</strong></td>
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<td>T 3/13</td>
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<td>15</td>
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<td>16</td>
<td>R 3/20</td>
<td>Eigenfunctions and Fourier series</td>
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<td>17</td>
<td>T 3/25</td>
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<td>18</td>
<td>R 3/27</td>
<td>LTI response to periodic inputs</td>
<td>O/W 3.8-3.9</td>
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<td>19</td>
<td>T 4/1</td>
<td>FS convergence and other issues</td>
<td>O/W 3.4, 3.10</td>
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<td>20</td>
<td>R 4/3</td>
<td><strong>Exam 2: covers material through 3/27</strong></td>
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<td>21</td>
<td>T 4/8</td>
<td>Fourier transform</td>
<td>O/W 4.0-4.2</td>
<td>9</td>
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<tr>
<td>22</td>
<td>R 4/10</td>
<td>Fourier transform properties</td>
<td>O/W 4.3</td>
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<tr>
<td>23</td>
<td>T 4/15</td>
<td>Convolution and multiplication properties</td>
<td>O/W 4.4-4.5</td>
<td>10</td>
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<tr>
<td>24</td>
<td>R 4/17</td>
<td>Frequency analysis of LTI systems</td>
<td>O/W 6.0-6.2</td>
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<tr>
<td>25</td>
<td>T 4/22</td>
<td>Ideal and practical filters</td>
<td>O/W 6.3-6.4</td>
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<td>26</td>
<td>R 4/24</td>
<td>Bode plots</td>
<td>O/W 6.5</td>
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<td>27</td>
<td>T 4/29</td>
<td>PZ plots and frequency response</td>
<td>O/W 9.4</td>
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<tr>
<td>28</td>
<td>R 5/1</td>
<td>LTI systems analysis</td>
<td>O/W 9.7</td>
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<td></td>
<td>T 5/13</td>
<td><strong>Comprehensive Final: 10:30am-1:15pm</strong></td>
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Notes: O/W indicates a reading assignment in the Oppenheim/Willsky textbook. A/S indicates a reading assignment in the Alexandar/Sidiku textbook.

Other Important Dates

- **January 28:** Last date to add courses and Last date to drop with no tuition penalty
- **February 11:** Last date to drop with 33% tuition penalty
- **February 21:** Last date to drop
- **March 10-16:** Spring break
  - **May 5:** Last day of classes
  - **May 6:** Reading day
- **May 7-14:** Exam period