George Mason University
Electrical and Computer Engineering Department
ECE 201: Introduction to Signal Analysis
Syllabus
Spring 2017

Professor: Professor Monson H. Hayes
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703-993-3969
hayes@gmu.edu

Class: Mon./Wed. 3:00-4:15pm
Planetary Hall 131

Office hours: TBD

Prerequisites: Grade of C or better in MATH 113

Required Textbook: *DSP First*, Second edition by J. H. McClellan, R. W. Schafer, and M. A. Yoder Pearson, 2015.

Course Webpage: `https://ece.gmu.edu/~hayes/courses/SignalAnalysis/index.html`
Currently Under Development

Laboratory TA:

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Course Overview

This course introduces students to key concepts in electrical and computer engineering (ECE). In particular students will learn the fundamental role played by sinusoidal and complex exponential signals for connecting the time and frequency domains. They will also learn properties of signal processing systems, such as linearity and time invariance. This course is designated as a *Discovery of Scholarship* course by the Office of Student Scholarship, Creative Activities, and Research (OSCAR). To fulfill its Discovery-level goals, this course will introduce students to scholarship, both as a general concept, and as done at Mason by students and faculty. They will also learn about the OSCAR program and opportunities for undergraduates to participate in research. By the end of the semester students will understand how knowledge of ECE is generated and disseminated through scholarship, and the importance of scholarship to society.

The workload for this course consists of the following: two class meetings and one laboratory session per week. Class time will be devoted to introducing fundamental concepts as well as learning how to use these concepts along with previously learned concepts, to critically analyze and solve problems. Students are expected to do the assigned reading prior to coming to class so that they are adequately prepared to better understand the lecture, as well as to solve problems that may be given on in-class quizzes. The course grade is based on performance on these readiness assessment tests, weekly homework assignments, laboratory projects, in-class examinations, and a comprehensive final examination. The remainder of this handout describes the course requirements in more detail.

Course Handouts

All handouts for the course (problem sets, problem set solutions, lab assignments plus other material) will be available on the course web page.

Course Prerequisites

The academic prerequisite for this course is a C or better in MATH 113. However, the most important prerequisite for the course is the willingness to work hard and an eagerness to learn. If you find yourself having trouble understanding a concept and putting it into practice, it will be extremely important to acknowledge that you are having trouble and get help, ask questions, and work extra problems.

Learning Outcomes

By the end of the course the successful ECE 201 student will achieve a number of desired learning outcomes:

- Student will demonstrate a working knowledge of complex arithmetic, including a visual understanding of the complex plane and the ability to use graphs to explain complex number calculations.
- Student will be able to apply mathematical techniques and concepts in order to analyze basic signals and systems. For example, the student will be able to determine the frequency of a sinusoid from either a graph or an equation. Given information about a system, the student will be able to assess whether it is linear, time-invariant, and causal.
- Student will distinguish between personal beliefs and evidence and will construct logical solutions to problems based on evidence.
- Student will be able to analyze information and make judgements about the validity of that information. For example, the student will be able to assess the accuracy and merits of a solution to a problem.
- Student will understand the research methods used in a discipline. Research requires critical thinking, the ability to learn independently, and the ability to assess one's own understanding of a topic. The student will build critical thinking skills through solving engineering problems. The student will exercise their learning and self-evaluation skills through weekly homework reflections, culminating in a semester summary document.
- Student will understand how to engage in the process of scholarship by being introduced to: 1) how Mason faculty are engaged in scholarly work, 2) undergraduate scholarly work at Mason, and 3) opportunities offered by the *Students as Scholars* initiative.

Class Meetings

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 the introduction to concepts, illustrative examples, and the working of problems to demonstrate how concepts may be applied to problem solving. It is important to come to class prepared in order to get the most out of lectures. Homework 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.

For 75 minutes it is expected that you will remain unplugged from the outside world. If a cell phone rings during class, and if it is heard by the instructor, there will be an immediate pop quiz and any material not covered due to the time it takes to administer the quiz will be the responsibility of the student to read about in the text.

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. In addition to doing the assigned reading prior to lecture, it will be essential for you to review the material covered in the previous lectures. To motivate you to do the necessary preparation, the first activity in some classes may be a readiness assessment test (RAT). Your grade on these RATs

will be 5% of your final grade for the class. 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.

Homework

There will be regular homework assignments (problem sets). These will be distributed via the course website only. You are expected to do ALL the assigned *Regular Problems*. There will alse be *Practice Problems* with answers that are for practice and drill. These will typically be drill problems to help you with the basic application of the concepts to solve problems. In making up the exams and in assigning a final grade, we 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 turned in via Blackboard 15 minutes prior to class on the day they are due. Late homework will not be accepted - no excuses - as this would prevent prompt posting of the solutions.** To submit handwritten homework in Blackboard, it must be scanned and saved as a single file. Scanning software must be used – photos of homework solutions are not acceptable, will not be graded, and will receive a grade of zero. At the end of the term, the lowest homework grade will be dropped from your overall homework score. Additional guidelines for the homework will be posted on the website.

Laboratory

Please see the laboratory syllabus and information sheet that will be distributed by the Teaching Assistant in charge of your lab.

Online Materials

All course materials will be available via the course webpage. The homework solutions will only be available via the Blackboard site. A class discussion board on Piazza is available.

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 201 material or the ECE program. See the course webpage for a complete listing of office hours. Feel free to attend the office hours of any member of the ECE 201 teaching staff.

Exams

There will be two in-class exams during the semester and one comprehensive final exam during exam week. The dates of the exams will be announced later. The 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 quizzes and exams are closed book. No calculators or other electronic devices are allowed.

Course Grade

The final grade in the course is based on our best assessment of your understanding of the material and the quality of your work during the semester. The exams, problem sets, laboratory projects, and other assignments are combined with the following rough weighting to give a preliminary final grade:

Exam 1	17.5%
Exam 2	17.5%
Final Exam	25%
Laboratory Grade	20%
Homework	10% (lowest score will be dropped)
Readiness Assessment Tests (RATs)	5% (lowest score will be dropped)
Participation	5%

In general, there will be no negotiations on homework grades. However, if a student wishes to have a homework grade reconsidered, or a particular problem on an exam regraded, then the request must be submitted in writing to the instructor within *2 class periods* after the work is returned. The request must include a paragraph describing why you feel that you should receive additional points. Once the request is received, the *entire* assignment or exam will be regraded - not just the problem in question. So, with any request you run the risk of ending up with fewer points than you originally were given.

There will be absolutely no requests considered for additional partial credit on an exam problem. Only errors in grading will be allowed to be appealed.

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 201 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 a member of the teaching staff.

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 homework also apply to the lab 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 we 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 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.