School of Engineering and Applied Science
Department of Electrical and Computer Engineering

ECE 4750 / 6750 – Digital Signal Processing
Spring 2015

This syllabus may be found on the course website on UVaCollab: 15Sp ECE 4750/6750.

Instructors:

Daniel Weller, Assistant Professor of Electrical and Computer Engineering.

Office:	Rice 309
Phone:	434-924-4271
Email*:	dweller@virginia.edu

* To call attention to your email, please put "ECE 4750" or "ECE 6750" somewhere in the subject line.

I will be holding open office hours once per week (Tuesdays, 11:30-1:30 pm), in my office (Rice 309). If you would like to meet with me outside of regular office hours, please call or email me to make an appointment.

Asma, Graduate Teaching Assistant.

Email:	fa5ar@virginia.edu

Asma will hold office hours once per week (Thursdays, 2-4 pm), in Rice 314.

Course Description:

From the registrar:

ECE 4750 (undergraduate section):
An introduction to digital signal processing. Topics include discrete-time signals and systems, application of z-transforms, the discrete-time Fourier transform, sampling, digital filter design, the discrete Fourier transform, the fast Fourier transform, quantization effects and nonlinear filters.
Prerequisite: ECE 3750.

Credits: 3

ECE 6750 (graduate section):
A first graduate course in digital signal processing. Topics include discrete-time signals and systems, application of z-transforms, the discrete-time Fourier transform, sampling, digital filter design, the discrete Fourier transform, the fast Fourier transform, quantization effects and nonlinear filters. Additional topics can include signal compression and multi-resolution processing.

Credits: 3

Textbook:

The following textbook is *required*:

Alan V. Oppenheim and Ronald W. Schafer. *Discrete-Time Signal Processing, 3/E.* Prentice-Hall, 2010.

It is widely available from many booksellers, including Amazon. An alternative electronic version of this textbook is available for 180-day digital rental from the publisher via `http://www.coursesmart.com/0132148153`. Used versions of the textbook are acceptable; however, some problems assigned as homework may not be present in earlier editions.

Grading:

Semester grades will be based on overall performance, weighted as follows:

ECE 4750 (undergraduate section):		*ECE 6750 (graduate section):*	
Homeworks:	25% (total)	Homeworks:	15% (total)
Midterm:	25%	Midterm:	20%
Final Exam:	30%	Final Exam:	30%
Mini-Project:	20%	Mini-Project:	20%
		Review Paper:	15%
Total:	100%	Total:	100%

Attendance: While no records will be taken of class attendance, students are responsible for all material covered in class, even if the material does not appear in the textbook or course notes available on Collab.

Homework: Homework must be turned in by the end of class on the due date. Once solutions are made available, no late homeworks will be accepted. If you require an extension, you must obtain my written permission before the date the homework is due. Extensions may delay the release of homework solutions.

Midterm: The midterm exam will be given during class on Wednesday, March 4. You will receive a grade of '0' for a missed exam. If you cannot take the exam during the regularly scheduled time, due to circumstances out of your control (being too busy with other classes is *not* an excuse), you must notify me prior to the exam to make alternate arrangements.

Final Exam: The final exam time is assigned by the registrar (see page 3). Exceptions to this time must be made in accordance with University policy. You must notify me of any conflicts within the first two weeks of class. I may be unable to accommodate late requests.

Mini-Project: Each student will pair with another student to choose and complete a term project together that applies concepts from the class in a creative way. These projects will culminate in a four-minute in-class presentation and individual written reports, graded individually.

Review Paper (graduate section only): Each student enrolled in the graduate section ECE 6750 will choose a research topic from a list I provide and complete a four-page paper introducing the topic and reviewing the current state-of-the-art in the area. The paper should be polished and clearly written to convey a deep understanding of the assigned area. The paper will be graded on both content and presentation (language, grammar, clarity). The paper should be formatted using an IEEE conference template: four pages, including references.

Honor Policy:

Students may discuss the concepts and homework problems with each other. However, all homeworks and exams turned in must be your own, individually written work. Computer programs (e.g., Matlab code) also must be original; turning in copied code constitutes plagiarism and will not be tolerated. Identical or copied solutions will receive a grade of zero. Your work is subject to the University of Virginia Honor System, and all exams will be pledged.

Disability Statement:

If you require specific accommodations due to disability, please inform me at the earliest possible time, preferably before or on the first day of class. I will work with the University to provide reasonable accommodations to ensure you have a fair opportunity to complete this course.

Course Outline:

1. Introduction to digital signal processing
2. Review of basic time-domain and frequency-domain concepts and transforms
3. Sampling and quantization
4. Design and analysis of discrete-time systems
5. Digital filter design and windowing
6. Discrete Fourier Transform
7. Spectral analysis
8. Linear prediction and parametric signal modeling
9. Additional topics: filter banks, MIMO signal/system analysis

$$\boxed{\text{Final Exam: 2 – 5 PM, Saturday, May 2}^*}$$

* set by the Registrar's office