ECE3220 - Signal Processing, Fall 2016 Course Information Page

<u>Course Instructor:</u> Kevin Buckley, Tolentine 433a, 610-519-5658, buckley@ece.villanova.edu, www.ece.villanova.edu/user/buckley

<u>Office Hours:</u> Mon. 12:30-1:30pm; Wed. 12:30-2:30pm; Fri. 8:30-9:20am; by appointment; stop by my office anytime I'm available.

TA: Sagar Bhatia; Office Hrs: Wed. 2:30-4:30pm, CEER 212

Prerequisites: ECE2051 or ECE2054, ECE2409, MAT2705

Lectures: MWF 11:30am-12:20pm (Tolentine 316)

<u>Practicum:</u> F 12:30pm-2:30pm (CEER 208)

Grading Policy:

- * Homeworks: Assigned for each Friday, but not collected
- * Practicum Reports: Due as indicated on the practicum Web page; 15 %
- \ast 10-20 Min. Quizzes: on Fridays throughout semester; 20 %
- * Test 1: Fri. Sept. 30, 20 %
- * Test 2: Fri. Nov. 11, 20 %
- * Final: 25 %

Course Text: Signals & Systems 2-nd ed., Oppenheim & Willsky, Prentice-Hall, 1997 (recommended but not required).

<u>Course Notes</u>: Available for free on the course Web page *(required)*.

References:

- 1. Schaum's Outline on Signals & Systems, Hsu, McGraw Hill,1995.
- 2. Schaum's Outline on Digital Signal Processing, Hayes, McGraw Hill,1998.
- 3. Digital Signal Processing: A Computer-Based Approach 3-rd ed., Mitra, McGraw Hill, 2006.
- 4. Discrete-Time Signal Processing, Oppenheim, Schafer & Buck, Prentice Hall, 1999.

Note: Also refer to your circuits book.

<u>Course Description</u>: This course introduces the theory and practices of signal processing and system analysis. Fundamental topics covered are signal representation and classifications, system representation and properties, linear time-invariant systems, convolution, various Fourier transforms, Laplace and z transforms, sampling, filtering and modulation. Application examples and computer implementations will constitute an integral part of the learning process.

Course Objectives:

- 1. Students will learn, and learn to apply, signals/systems analysis and design tools. These tools include transforms (i.e. Fourier, Laplace and z transforms) and convolution.
- 2. Students will apply their knowledge of mathematics (i.e. differential equations, calculus, algebra, trigonometry) and engineering (i.e. circuits) to develop an understanding of the higher level tools used in signal/system analysis and design.
- 3. Students will perform Matlab based experiments (i.e. practicums) which investigate the concepts and apply the engineering tools learned in class. In several of these practicums students will be required to develop processing tools and to identify their own experiments to test the tools they developed.
- 4. Students will solve engineering problems related to signal processing, for example: inverting communications channels, deblurring images, analyzing the frequency spectrum of signals, synthesizing music, analyzing modulation systems, and designing/analyzing frequency selective filters.

Villanova Disabilities Statement:

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability (non-physical) please register with the Learning Support Office by contacting Learning.support.services@villanova.edu or 610-519-5176 as soon as possible. Registration is needed in order to receive accommodations.

The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact Gregory Hannah, advisor to students with disabilities at 610-519-3209 or visit the office on the second floor of the Connelly Center.