Course Instructor: Kevin Buckley, Tolentine 433a, 610-519-5658, buckley@ece.villanova.edu, www.ece.villanova.edu/user/buckley
Office Hours:
- Mon. & Wed. 11:30am-12:20pm
- Thurs. noon-2pm
- Fri. 9:30-10:20am
by appointment, or stop by any time I’m available

TA: Sagar Bhatia
Office Hours: Wed. 11:45am - 1:30pm, Tolentine 407

Prerequisites: ECE 2052, ECE 2409, MAT 1505

Lectures: Mon., Wed., Fri. 10:30-11:20am; Tolentine 316

Practicum: Thurs. 9-11am; CEER 001

Grading Policy:
* Practicum Reports: Due as posted on practicum Web page; 20 %
* Homeworks: Assigned for each Fri., but not collected
* 15-20 Min. Quizzes: Each Fri. starting Jan. 27; 20 %
* Test 1: Course Outline Sections [1-2]; Thurs. Feb. 23; 20 %
* Test 2: Course Outline Sections [3,4]; Thurs. Mar. 16; 10 %
* Test 3: Course Outline Sects. [5.1-6]; Thurs. Apr. 6; 10 %
* Final: Convolution, Course Outline Sects. [5.7-11, 6]; Sat. May 6, 10:45am-12:45pm; 20%


Course Notes: Available for free on the course Web page (required).

References:
Course Topics:

- Signals: basic signals, operations and notation
- Systems: basic concepts and properties
- Linear, time-invariant systems
- Discrete-Time Convolution
- Spectra, and the Continuous-Time Fourier Series (CTFS)
- Sampling
- Transforms: basic concept, purpose and utilization
  - Discrete Time Fourier Series (DTFS)
  - Discrete Time Fourier Transform (DTFT)
  - Continuous Time Fourier Series (CTFS)
  - Continuous Time Fourier Transform (CTFT)
  - z-Transform
  - Laplace Transform

The approach will be to cover a couple of discrete-time transforms in depth, and then to introduce the rest and emphasize similarities/differences between them all.

- Advanced Topics:
  - Filtering
  - Channel Equalization
  - Modulation
  - Random Processes

The objective with these will be to provide a very basic understanding.
Course Objectives:

1. Students will learn, and learn to apply, discrete-time signals/systems analysis and design tools. These tools include transforms (i.e. Fourier 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, programming) to develop an understanding of the higher level tools used in discrete-time 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 discrete-time 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.

College Professional Development Requirement:

As part of this course you are to complete the College of Engineering Professional Development (PD) requirements which are detailed here:

http://www1.villanova.edu/villanova/engineering/undergrad/professionaldevelopment/juniorDetails.html

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 @ 610-519-3209 or visit the office on the second floor of the Connelly Center.