Olin College of Engineering
ENGR2410 – Signal and Systems

Spring 2016 Course Syllabus

Instructor
José Oscar Mur-Miranda, jomm@olin.edu, (781)292-2544

Course assistants
Casey Alvarado, Cameron Anderson, Erin Pierce, Jay Woo

Course description
Linear system theory is a powerful set of mathematical tools used broadly across science and engineering. Signals represent the transfer of information or power, while systems represent operations on these signals. This course presents fundamental concepts from linear systems such as convolution, impulse and step response, Fourier transforms, sampling and modulation. These concepts are presented within the framework of linear operators and/or transforms in discrete and/or continuous time. Applications include filters, system identification, deconvolution, feedback and control, and communications.

Prerequisites
First-semester physics, math and engineering or equivalent

Recommended reference textbook(s)
- *Signal and Systems, 2nd edition*, Alan V. Oppenheim, and Alan S. Willsky, Prentice-Mall, Hardcover, 957pp, ISBN 0-13-814757-4, ©1997
- *Signals and Systems Made Ridiculously Simple*, Zoher Z. Karu, ZiZi Press, Paperback, 122pp, ISBN 0-96-437521-4, ©1995
- *Foundations of Analog and Digital Electronic Circuits*, Anant Agarwal and Jeffrey H. Lang, Morgan Kaufmann, Paperback, 1008pp, ISBN 1-55-860735-8, ©2005

Course website
http://faculty.olin.edu/jmurmiranda/sigsys/2016/

Course objectives
By the end of the course, the students should be able to:
- Apply mathematical transforms appropriately to solve problems.
- Analyze 1st and 2nd order systems using frequency domain concepts and techniques.

Topics covered
- 1st and 2nd order step, impulse and frequency response
- Transfer function and its relation to the impulse response
- Fourier and Laplace transforms
- Pole/zero representation of linear, time-invariant (LTI) systems
- LTI system stability
- Applications such as filters, modulation, and sampling

Class schedule and location
Mondays and Thursdays 3:20pm–5:00pm in AC304

Relationship of course to program outcomes and method of assessment
Extensive development of quantitative analysis at an intermediate level will be assessed through 10 problem sets (3% each dropping the two lowest scores, 24% total), 8 quizzes (8% each dropping the two lowest scores, 48% total), a project (18%), and a 10% professionalism grade to be determined by the course staff.

Course policies
Students are expected to arrive on time to class and remain engaged while in the classroom. Laptops will be closed during class.

All work must be clear, intelligible and neat. Students may collaborate on assignment problems, but the work handed in must be individual and reflect the individual's own effort and understanding. Assignments are due at the end of the day on Monday. Students will discuss and grade each other's assignments using the solutions after the Monday deadline in groups of three and will submit all the group's scores with the quizzes on Thursday. The group work should serve as preparation for that week's quiz. The two lowest assignment scores will be eliminated to allow for unforeseeable circumstances.

Collaboration is not allowed on quizzes. Quizzes are due at the beginning of lecture on Thursday and limited to one continuous hour of individual work. Students may only use a page of notes during the quizzes. **Late or missed quizzes will be given a score of zero. Any excuses must come directly from the Office of Student Life.** The two lowest quiz scores will be eliminated to allow for unforeseeable circumstances.

In case of doubt, students are expected to base their behavior on the values expressed in the Honor Code. As implied in the "Do Something" clause, students will be expected to be active stewards of their learning and provide feedback as necessary.