Course Information

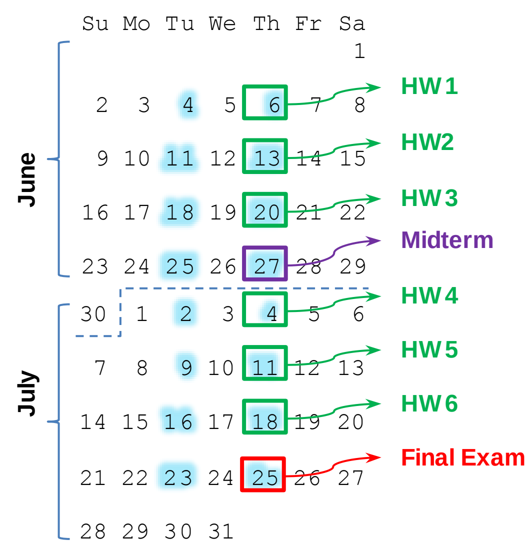
INSTRUCTOR	Daniel Llamocca
PREREQUISITES	ECE-213 and MATH-264
CONTACT INFO	Email: *dllamocc@unm.edu*
CLASS WEBPAGE	*dllamocca.org/Summer2013_ece314.htm*
TEXTBOOK	Simon Haykin and Barry Van Veen, "Signals and Systems", Second Edition, John Wiley and Sons, 2003. (extra reference): A.V. Oppenheim, A.S. Wilsky, and S.H. Naway, "Signals and Systems", Second Edition, Prentice Hall Inc., New Jersey, 1997
OFFICE HOURS	Wednesdays: 2:00 to 3:00 pm @ Room HOK237, or by appointment
LECTURES	Tuesdays/Thursdays 2:00 pm - 4:50 pm @Room ECE-132

GRADING SCHEME:

Homeworks: 30%
Midterm: 30% (June 27th @ 2pm)
Final Exam: 40% (July 25th @ 2pm)

GRADE ASSIGNMENT:

90-100	A
80-89	B
70-79	C
60-69	D
59 and below	F



COURSE CATALOG DESCRIPTION: ECE 314 - Signals and Systems (3 credits)

Continuous and discrete time signals and systems; time and frequency domain analysis of LTI systems. Fourier series and transforms, discrete time Fourier series/transform, sampling theorem, block diagrams, modulation/demodulation, filters.

OUTLINE OF TOPICS

Introduction (Ch. 1 textbook: 1.1 - 1.7)	What is a signal? What is a system? Classification of signals Basic operations on signals
	Elementary signals Systems viewed as integration of operations Properties of Systems
Time-domain representations of Linear Time-Invariant (LTI) Systems (Ch. 2 textbook: 2.1 - 2.12)	Introduction Discrete-Time LTI Systems: The Convolution Sum Continuous-Time LTI Systems: The Convolution Integral Properties of Linear Time-Invariant Systems Interconnections of LTI systems
	Impulse response, step response LTI Systems: Characteristics and representations by Differential and difference equations Block Diagram representations

Fourier representations of Signals and Linear Time-Invariant Systems (Ch. 3 textbook: 3.1-3.18, Ch. 4 textbook: 4.1-4.4)	Response of Continuous-Time LTI Systems to Complex Exponentials Representation of Continuous-time periodic signals: The continuous-time Fourier Series Representation of Continuous-Time aperiodic signals: The continuous-time Fourier transform Periodic signals and the continuous time Fourier transform Properties of the Continuous-Time Fourier Transform: Convolution, Modulation, etc. Polar representation of continuous-time Fourier Transform
	Response of Discrete-Time LTI Systems to complex exponentials. Representation of Discrete-Time periodic signals: The Discrete-Time Fourier Series Representation of Discrete-Time aperiodic signals: The Discrete-time Fourier transform Periodic signals and the Discrete-Time Fourier Transform Properties of the Discrete-Time Fourier Transform: Convolution, Modulation, Duality, etc. Polar representation of Discrete-Time Fourier Transform
Sampling (Ch. 4 textbook: 4.5-4.9)	Introduction The Sampling Theorem: Representation of a continuous-time signal by its samples Reconstruction of continuous-time signals from samples The effect of undersampling: aliasing Discrete-Time processing of continuous-time signals Sampling in the frequency domain Sampling of Discrete-Time Signals
Application to Communication Systems (Ch. 5 textbook: 5.1 - 5.4)	Types of modulation Benefits of Modulation Full Amplitude modulation
The Laplace Transform: Representing signals by using continuous-time complex exponentials (Ch. 6 textbook: 6.1-6.13)	The Laplace Transform The Region of Convergence for Laplace Transforms The Inverse Laplace Transform Geometric evaluation of the Fourier Transform from the Pole-Zero plot Properties of the Laplace Transform Some Laplace Transform pairs Analysis and characterization of LTI Systems using the Laplace Transform The Unilateral Laplace Transform
The z-Transform: Representing signals by using Discrete-Time Complex Exponentials: (Ch. 7 textbook: 7.1-7.10)	The z-Transform The region of Convergence for the z-Transform The Inverse z-Transform Geometric evaluation of the Fourier Transform from the Pole-zero plot Properties of the z-Transform
	Some common z-transform pairs Analysis and characterization of LTI systems using z-Transforms Transformations between continuous-time and discrete-time systems The Unilateral z-transform
Application to Filters and Equalizers (as time allows) (Ch. 8 textbook: 8.1-8.10)	Ideal frequency-selective filters Nonideal frequency-selective filters Examples of continuous-time frequency-selective filters described by differential equations Examples of continuous-time frequency-selective filters described by difference equations Digital filters: FIR Digital Filters, IIR Digital Filters

ADDITIONAL INFORMATION

- **Prerequisites**: ECE-213 (Circuit analysis II) and MATH-264 (Calculus III) are listed as prerequisites.
  Expected ECE-213 (Circuits II) knowledge: Time--domain analysis of differential equations, convolution, Fourier series, frequency response, Laplace transform, and phasor analysis.
  Expected knowledge in mathematics: functions, sequences and series, limits of sequences and functions, continuity, differentiation, integration, solutions to linear ordinary differential equations with constant coefficients, knowledge of complex numbers and complex-number arithmetic.

- **MATLAB**
  Throughout the lectures, the instructor will use MATLAB as a teaching tool. Homework assignments will sometimes require the use of MATLAB. This software is available in the ECE computer labs. In addition, UNM students can download and install a free copy in their computers.

- **Exams**
  The midterm exam and the final exam for the course will be in-class type exams. These exams are closed-books, closed-notes, mode exams. The final exam will be a comprehensive test that will cover the whole syllabus. Please note that students are not allowed to take the exam neither before or after the exam date. Make-up exams are given *only* under extreme circumstances (such as a medical emergency).

- **Homeworks**
  Homework assignments are meant to strengthen your conceptual understanding of the topics. Completing homework assignments is a key component of this course as it will help students master the course material and prepare them for the exams. Students have one week to return the assignments. Late submissions are NOT accepted.

- **Attendance**
  Attendance is mandatory and maybe monitored. A student may be absent for no more than two lectures during the entire semester without the instructor's permission. Missing more than two lectures requires the permission of the instructor.

- **Cheating and Academic Honesty**
  It is assumed that students are familiar with the university academic honest policy. Copying and dishonesty will be dealt with seriously and appropriately.