

EE 312 Signals and Systems I (3 credits)
Fall 2015
Klipsch School of Electrical and Computer Engineering
College of Engineering
New Mexico State University

Instructor and Class Information

Instructor: Prof. Phillip De Leon, Goddard Annex 160G, (575) 646-DSP1 (3771), pdeleon@nmsu.edu

Class Days and Times: Monday, Wednesday, and Friday 10:30 – 11:20am, T&B 204

Office Hours: Wednesday 9:00 – 10:00am, Thursday 3:30 – 4:30pm, and by prior appointment

Teaching Assistants (TAs): Mr. Aditya Patil, Goddard Annex 155, aditya30@nmsu.edu

Mr. Mandip Shrestha, T&B 205B, mandip@nmsu.edu

TA Office Hours: Friday 8:00 - 9:00am (AP), Thursday 11:00am - 12:00pm (MS)

Course Description from the Undergraduate Course Catalog

Continuous- and discrete-time signals and systems. Time- and frequency- characterization of signals and systems. Transform-domain methods including Fourier-, Laplace-, and z -transforms.

Prerequisites

A grade of C or better in EE 210 Engineering Analysis I, EE 280 DC and AC Circuits, and MATH 392 Introduction to Ordinary Differential Equations.

Students will be automatically dropped without these prerequisites.

Textbook and Other Required Materials

Required (Print): *Signals and Systems, 2nd Edition* by Alan V. Oppenheim and Alan S. Willsky (ISBN-13: 978-0138147570)

Only National Council of Examiners for Engineering and Surveying (NCEES) acceptable calculators will be allowed during exams: Casio fx-115 models (calculator must contain fx-115 in its model name), HP 33s and HP 35s, and TI-30X and TI-36X models (calculator must contain TI-30X or TI-36X in its model name). For more information, see

<http://ncees.org/exams/calculator-policy/>

Approved calculators are also available for checkout in the ECE office.

Laboratory Resources

Some homework problems may require the use of MATLAB. Computer labs in T&B 202 and 206 are equipped with PCs and MATLAB. The student version of MATLAB can be purchased from the campus bookstore. GNU Octave or Python may also be used.

Online Resources

EE 312 Web Page

<http://wordpress.nmsu.edu/pdeleon/teaching/ee312>

Course announcements and student grades will be posted on Canvas

<http://learn.nmsu.edu>

Note: Please do not email Prof. De Leon through Canvas--use the email address listed above.

Course Objectives

The objectives of this course are:

1. Understand different types of signals (continuous-time, discrete-time, periodic, etc.) and how these signals are represented mathematically and in a computer. Student Outcome 1.
2. Understand systems representations (e.g., impulse responses), their implementations (e.g., convolution and difference/differential equations), and their properties (e.g., linearity). Student Outcomes 1, 5.
3. Gain insight into transform-domain analysis methods for signals and systems. Student Outcomes 1, 5.
4. Develop the ability to apply transform domain and LTI analysis to simple applications in signal processing, communications, and controls using Matlab. Student Outcomes 5, 11.

Contribution of EE 312 to Meeting the Professional Component

This course contributes three semester hours of engineering topics. This course is foundational in the use and analysis of signal processing, communication, and control systems. In this class, the students will be expected to attain a level of competency in the foundational topics necessary for each of the three areas. This course lays the groundwork for advanced study in several areas of electrical engineering, including digital signal processing, communication systems, and control systems.

Relationship of the Course to Program Objectives

This class addresses the following outcomes:

1. Ability to apply knowledge of mathematics, science and engineering.
5. Ability to identify, formulate, and solve engineering problems.
11. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Americans with Disabilities Act/Office of Institutional Equity (ADA/OIE)

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Trudy Luken

Student Accessibility Services (SAS) - Corbett Center, Rm. 244

Phone: (575) 646-6840 E-mail: sas@nmsu.edu

Website: <http://eeo.nmsu.edu/disability-information/>

Policy Statement on Equal Employment Opportunity and Affirmative Action

NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation. For more information on discrimination issues, Title IX or NMSU's complaint process contact:

Gerard Nevarez or Agustin Diaz

Office of Institutional Equity (OIE) - O'Loughlin House

Phone: (575) 646-3635 E-mail: equity@nmsu.edu

Website: <http://eeo.nmsu.edu/>

Grading

Homework (25%) – Homework assignments will be announced in class and posted online. Denote the total homework grade as x , average of the homework assignments as y , and exam average as z . Then (min function takes the smallest or minimum of the arguments)

$$x = \min (y , z + 15\%)$$

and is worth 25% of the final grade. It is expected solution approaches will be worked out individually, in groups, with the TA, or with Prof. De Leon and individual solutions submitted. Late homework is not accepted except in the case of an absence due to a medical or other very serious reason.

Exams (25% each) – There will be two exams each worth 25% of the final grade

Exam #1 is scheduled for Wednesday, September 23 from 6:30pm – 8:30pm.

Exam #2 is scheduled for Wednesday, October 28 from 6:30pm – 8:30pm.

Final Exam (25%) – The final examination is scheduled for Monday, December 7 from 10:30am – 12:30pm and is worth 25% of the final grade.

Note: No early exams will be given. No makeup exams will be given unless a very serious situation arose which prevented taking the exam as scheduled.

Bonus – Each technical question related to signals and systems asked during class will add 1% to the final grade (up to 2% allowed). This bonus only applies to questions asked on or before Wednesday, October 28. Students must request bonus credit within 2 days of question via email; student will receive email confirmation of bonus point(s).

Final Grade – Final grade will be assigned as follows.

A+	>100%	C+	79 – 76%
A	100 – 95%	C	75 – 73%
A–	94 – 90%	C–	72 – 70%
B+	89 – 86%	D+	69 – 66%
B	85 – 83%	D	65 – 63%
B–	82 – 80%	D–	62 – 60%

The NMSU Student Code of Conduct can be found at

<http://deanofstudents.nmsu.edu/student-handbook/1-student-code-of-conduct/>

Plagiarism is using another person's work without acknowledgment, making it appear to be one's own. Intentional and unintentional instances of plagiarism are considered instances of academic misconduct and are subject to disciplinary action such as failure on the assignment, failure of the course or dismissal from the university. The NMSU Library has more information and help on how to avoid plagiarism at

<http://lib.nmsu.edu/plagiarism/>

Any act of academic dishonesty, i.e. cheating on exam, plagiarizing a homework, etc... may result in disciplinary action.

Policies

Disputes regarding homework or exam grades must be submitted in writing to Prof. De Leon for review within 7 days after graded work has been returned or posted.

As a courtesy to the instructor and fellow students, please TURN OFF your cell phones. Any student who disrupts class due to the use of an unwelcomed electronic device will be asked to leave.

Recording/Streaming Lecture

Lectures may be recorded or streamed live ([Livestream](#), [Meerkat](#), [Periscope](#)), however, commercial use is strictly prohibited.

Topics Covered / Course Schedule

The topics covered and course schedule are described in the Course Schedule section of this syllabus.

Prepared

Phillip De Leon, 19 August 2015.

EE 312 Fall 2015 Course Schedule

This schedule is an estimate of the topics covered each week throughout the course. The following chapters are from *Signals and Systems, 2nd Edition* by Alan V. Oppenheim and Alan S. Willsky (ISBN-13: 978-0138147570)

Week 1 August 16, 2015

Chapter 1: Signals and Systems

Week 2 August 23, 2015

Chapter 1: Signals and Systems

Week 3 August 30, 2015

Chapter 1: Signals and Systems

Week 4 September 6, 2015

Monday, September 7 Labor Day (no class)

Chapter 2: Linear Time-Invariant Systems

Week 5 September 13, 2015

Chapter 2: Linear Time-Invariant Systems

Week 6 September 20, 2015

Exam #1 Wednesday, September 23, 6:30 – 8:30pm

Chapters 1 and 2 Review

Week 7 September 27, 2015

Chapter 3: Fourier Series Representation of Periodic Signals

Week 8 October 4, 2015

Chapter 3: Fourier Series Representation of Periodic Signals

Week 9 October 11, 2015

Chapter 4: The Continuous-Time Fourier Transform

Week 10 October 18, 2015

Chapter 4: The Continuous-Time Fourier Transform

Week 11 October 25, 2015

No class Monday, October 26

Exam #2 Wednesday, October 28, 6:30 – 8:30pm

Chapters 3 and 4 Review

Week 12 November 1, 2015

Chapter 5: The Discrete-Time Fourier Transform

Week 13 November 8, 2015

Chapter 5: The Discrete-Time Fourier Transform

Week 14 November 15, 2015

Chapter 6: Time and Frequency Characterization of Signals and Systems

Week 15 November 22, 2015

Thanksgiving Break! (no classes)

Week 16 November 29, 2015

Chapter 6: Time and Frequency Characterization of Signals and Systems

Week 17 December 6, 2015

Final Exam Monday, December 7, 10:30am – 12:30pm

EE312 Spring 2015 Course Schedule

This schedule is an estimate of the topics covered each week throughout the course. The following chapters are from Signals and Systems, 2nd Edition by Alan V. Oppenheim and Alan S. Willsky (ISBN-13: 978-0138147570)

Week 1 January 11, 2015
Chapter 1: Signals and Systems

Week 2 January 18, 2015
Mon. Jan. 19 MLK Day (no class)
Chapter 1: Signals and Systems

Week 3 January 25, 2015
Chapter 1: Signals and Systems

Week 4 February 1, 2015
Chapter 2: Linear Time-Invariant Systems

Week 5 February 8, 2015
Chapter 2: Linear Time-Invariant Systems

Week 6 February 15, 2015
Wed. Feb. 18, 6:30 – 8:30pm Exam #1
(Chapters 1 and 2)
Fri. Feb. 20 no class
Chapter 2: Linear Time-Invariant Systems

Week 7 February 22, 2015
Chapter 3: Fourier Series Representation of
Periodic Signals

Week 8 March 1, 2015
Fri. Mar. 6 no class
Chapter 3: Fourier Series Representation of
Periodic Signals

Week 9 March 8, 2015
Chapter 3: Fourier Series Representation of
Periodic Signals

Week 10 March 15, 2015
Chapter 4: The Continuous-Time Fourier
Transform

Week 11 March 22, 2015
Spring Break! (no classes)

Week 12 March 29, 2015
Wed. Apr. 1, 6:30 – 8:30pm Exam #2 (Chapters 3
and 4)
Fri. Apr. 3 Spring Holiday (no class)
Chapters 3 and 4 Review

Week 13 April 5, 2015
Chapter 5: The Discrete-Time Fourier
Transform

Week 14 April 12, 2015
Chapter 5: The Discrete-Time Fourier
Transform

Week 15 April 19, 2015
Chapter 6: Time and Frequency
Characterization of Signals and Systems

Week 16 April 26, 2015
Chapter 6: Time and Frequency
Characterization of Signals and Systems

Week 17 May 3, 2015
Mon., May 4, 10:30am – 12:30pm Final Exam
(Comprehensive)

