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 Assistant (TA): Chris Trujillo, T&B205, cjt2012@nmsu.edu
TA Office Hours: Friday 9:30 - 10:30am

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/Co-requisite
A grade of C or better in EE 210 Engineering Analysis I and EE 280 DC and AC Circuits (prerequisites). A grade of C or better or current registration in MATH 392 Introduction to Ordinary Differential Equations.

Students will be automatically dropped without these prerequisites/co-requisite.

Textbook and Other Required Materials

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). Approved calculators are also available for checkout in the ECE office. For more information, see http://ncees.org/exams/calculator-policy/

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 Student Union, Rm. 208
Phone: (575) 646-6840 E-mail: sas@nmsu.edu | Website: http://sas.nmsu.edu/

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 assault, rape), sexual harassment and retaliation.

For more information on discrimination issues, Title IX, Campus SaVE Act, NMSU Policy Chapter 3.25, NMSU’s complaint process, or to file a complaint contact:
Lauri Millot, Director and Title IX Coordinator
Agustin Diaz, Associate Director, Title IX Deputy Coordinator
Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue
Phone: (575) 646-3635 | E-mail: equity@nmsu.edu | Website: http://eeo.nmsu.edu/
Other NMSU Resources
NMSU Police Department: (575) 646-3311  http://www.nmsupolice.com/
NMSU Police Victim Services: (575) 646-3424
NMSU Counseling Center: (575) 646-2731
NMSU Dean of Students: (575) 646-1722
For Any On-campus Emergencies: 911

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 21 from 6:30pm – 8:30pm in HJLC 230
Exam #2 is scheduled for Wednesday, October 26 from 6:30pm – 8:30pm in HJLC 230.

Final Exam (25%) – The final examination is scheduled for Monday, December 5 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 26. 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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>&gt;100%</td>
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<tr>
<td>A</td>
<td>100 – 95%</td>
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<tr>
<td>A−</td>
<td>94 – 90%</td>
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<tr>
<td>B+</td>
<td>89 – 86%</td>
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<tr>
<td>B</td>
<td>85 – 83%</td>
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<tr>
<td>B−</td>
<td>82 – 80%</td>
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<tr>
<td>C+</td>
<td>79 – 76%</td>
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<tr>
<td>C</td>
<td>75 – 73%</td>
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<tr>
<td>C−</td>
<td>72 – 70%</td>
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<tr>
<td>D+</td>
<td>69 – 66%</td>
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<tr>
<td>D</td>
<td>65 – 63%</td>
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<tr>
<td>D−</td>
<td>62 – 60%</td>
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Policies
The College of Engineering has a “2 strikes and you’re out” policy for academic misconduct. This means that a student will be suspended after found guilty of two academic misconduct cases. Suspension means out for one year. A strike can count from academic misconduct occurring in any college. The NMSU Student Code of Conduct can be found at: http://studenthandbook.nmsu.edu/student-code-of-conduct/academic-misconduct/

Additional regulations may be found in the catalog regulation section http://nmsu.smartcatalogiq.com/en/2016-2016/Undergraduate-Catalog/General-Information/Regulations
and in the college of engineering section


The latest online catalog information from these sections, in addition to this syllabus, serve as your contract with the College of Engineering.

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](https://www.livestream.com), [Meerkat](https://meerkat.com), [Periscope](https://twitter.com/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, 17 August 2016.
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 14, 2016  
Chapter 1: Signals and Systems

**Week 2** August 21, 2016  
Chapter 1: Signals and Systems

**Week 3** August 28, 2016  
No class Friday, Aug. 26  
Chapter 1: Signals and Systems

**Week 4** September 4, 2016  
Monday, Sep. 5 Labor Day (no class)  
Chapter 2: Linear Time-Invariant Systems

**Week 5** September 11, 2016  
Chapter 2: Linear Time-Invariant Systems

**Week 6** September 18, 2016  
Exam #1 Wed., Sep. 21, 6:30 – 8:30pm HJLC 230  
Chapters 1 and 2 Review

**Week 7** September 25, 2016  
No class Monday, Sep. 26  
Chapter 3: Fourier Series Representation of Periodic Signals

**Week 8** October 2, 2016  
Chapter 3: Fourier Series Representation of Periodic Signals

**Week 9** October 9, 2016  
Chapter 4: The Continuous-Time Fourier Transform

**Week 10** October 16, 2016  
Chapter 4: The Continuous-Time Fourier Transform

**Week 11** October 23, 2016  
Exam #2 Wed., Oct. 26, 6:30 – 8:30pm HJLC 230  
Chapters 3 and 4 Review

**Week 12** October 30, 2016  
Chapter 5: The Discrete-Time Fourier Transform

**Week 13** November 6, 2016  
Chapter 5: The Discrete-Time Fourier Transform

**Week 14** November 13, 2016  
Chapter 6: Time and Frequency Characterization of Signals and Systems

**Week 15** November 20, 2016  
Thanksgiving Break! (no classes)

**Week 16** November 27, 2016  
Chapter 6: Time and Frequency Characterization of Signals and Systems

**Week 17** December 4, 2016  
Final Exam Monday, Dec 5, 10:30am – 12:30pm