San José State University  
College of Engineering, Electrical Engineering Department  
EE210-01, Linear Systems Theory, Fall 2018

Course and Contact Information
Instructor: Jalil Kamali
Office Location: ENG383
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Email: jalil@ieee.org
Office Hours: T&TR 7:00-7:30 pm
Class Days/Time: T&TR 7:30-8:45 pm
Classroom: ENG345
Prerequisites: Graduate Standing

Course Format

Faculty Web Page and MYSJSU Messaging
Copies of some of the course materials such as homework assignments will be posted on the following web-site.

http://www.engr.sjsu.edu/jkamali/

Course Description


Specific topics covered in EE210 include:
1- Discrete-time signals and systems
2- Linear and time-invariant (LTI) systems, Convolution
3- Discrete-time Fourier transform & properties
4- The Z-transform & properties
5- Fourier transform and Laplace transform of continuous-time signals & properties
6- Sampling & reconstruction of continuous-time signals
7- Frequency response and pole/zero relationship
8- Example FIR & IIR filters; linear-phase filters
9- Filter realization; Cascade, parallel, …
10- The Discrete Fourier Transform (DFT) and fast implementations (FFT)
11- State space representation of discrete-time and continuous-time systems
12- Selected applications
**Course Learning Outcomes (CLO)**

Upon successful completion of this course, students will be able to:

**LO1**: analytically and numerically calculate spectra of continuous-time and discrete-time signals from various Fourier transform definitions and transform properties.

**LO2**: infer from signals and their spectra basic attributes including energy, power, width, moments, among others.

**LO3**: analytically and numerically perform basic signal operations such as convolutions, and correlations in either the time or frequency domain and to relate such operations to real-life applications.

**LO4**: assess various system attributes such as linearity, shift invariance, causality, and stability, and to understand their relationship to the system function.

**LO5**: analyze the time and frequency responses of linear shift invariant systems to aperiodic and periodic temporal or spatial input signals both in the real-frequency and complex-frequency domains.

**LO6**: relate the developed analysis methodologies to real-life applications such as filtering, sampling, imaging, control, communications, bio, signal processing, among others.

**Required Texts/Readings**

**Textbook**

*Discrete-Time Signal Processing*, 3rd Ed., by Oppenheim and Schafer, Pearson/Prentice-Hall 2010 (comprehensive coverage of discrete-time linear systems). This text is available at the Spartan Bookstore and from many online sites. The course covers selected sections of Chapters 2 to 9. The covered sections that students are required to read will be specified at the beginning of each chapter.

**Other Readings**

The above textbook does not cover the continuous-time portion of the course. While the notes taken in the class is sufficient for this material, interested students may use the following book as well.

*Signals and Systems*, 2nd Ed., by Oppenheim and Willsky, Prentice-Hall

**Other technology requirements / equipment / material**

None is required. The Student Version of Matlab is recommended for supporting numerical computations when needed. Matlab may be used to demonstrate some topics in the class. However, use of Matlab is optional; no Matlab-specific problems will be part of the homework or the exams.

**Course Requirements and Assignments**

While Homework is not part of the students’ grading, it is crucial for understanding the course material. Homework will be assigned regularly and the solutions will be posted shortly thereafter.

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.”
Examinations

There will be two midterms and one final examination in this course at the following dates.

Midterm Exam #1: Tuesday October 2\textsuperscript{nd}, 2018 in class
Midterm Exam #2: Thursday November 1\textsuperscript{st}, 2018 in class
Final Exam: Thursday December 13\textsuperscript{th}, 2018 7:45-10:00PM

Grading Information

The grades will be determined based on the overall score in the exams according to the following percentages.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm Exam #1</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm Exam #2</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
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</tbody>
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Classroom Protocol

Class attendance is not required in this course. If a student chooses to attend, however, he/she is expected to observe the following classroom protocol.

1. Students need to be on time.
2. Use of laptop, cell phone, and other electronic devices are absolutely prohibited during the class time.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/’