Instructor: Huaping Liu, Kelly 4115, 541-737-2973, hliu@eecs.oregonstate.edu

Lecture Time & Room:  MWF, 10:00-10:50 AM, KEC 1001 (classroom)

Prerequisites:  Junior standing in ECE, ENGR 203, MTH 256.
Courses that require this as a prerequisite:  ECE 352

Goals:
- Matlab skills (using help and basic commands, program using vectors & matrices)
- Basic concepts of continuous- and discrete-time signals and systems (focus on linear time-invariant (LTI) systems).
- Time-domain analysis, LTI continuous-time (CT) and discrete-time (DT) systems.
- Frequency-domain analysis of CT/DT signals and LTI systems.
- Fourier representations of mixed signal classes.


Recommended MATLAB Text:

References:

Computer tools:
Matlab and Simulink

Course policies:
- Grading:
  - Mid-term #1:  25%
  - Mid-term #2:  25%
  - Final exam:  40%
  - Homework:  10%
- Mid-term and final exams:
  Closed book, closed notes (two sheets of formulas allowed).
- Homework:
  Students are expected to finish all assigned homework problems and projects and hand them in on time. No late homework/projects will be accepted.
- Office hours:
  Instructor: Huaping Liu, MWF: 11:00am-12:00pm, and by appointment
  Teaching Assistants:
  ✓ Jennifer M. Williams: Wednesdays and Fridays 12:30-2:00pm. Office hour location: KEC Atrium (look for ECE 351 sign).
  ✓ Shijia Lin: Tuesdays 1:30-3:00pm and Thursdays 11:00am-12:30pm. Office hour location: KEC Atrium (look for ECE 351 sign).

Class web page:  http://web.engr.oregonstate.edu/~hliu/ECE351/ece351.html
There is a link to 351 on EECS class page: http://classes.engr.oregonstate.edu/eecs

Honor code:
Students should provide their own (unassisted by anyone) solutions to all homework problems and projects, but may discuss with their colleagues on interpretation of the problems. Unauthorized assistance in any form is prohibited.
## Rough Schedule and Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Chapters</th>
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| 1    | • Elementary CT and DT signals & systems (5 lectures)  
  − Basic concepts of signals and systems  
  − Classification of signals | Chapter 1 |
|      | 2      |  
  − Elementary signals  
  − System properties  
  • **Linear time-invariant systems (5 lectures)**  
  − Convolution sum | Chapter 2 |
| 3    |  
  − Convolution integral  
  − LTI system properties | |
| 4    |  
  • **Differential and difference LTI systems (3 lectures)**  
  − Causal LTI system described by differential and difference equations | Chapter 3 |
| 5    |  
  − Impulse response of differential & difference LTI systems  
  − Characteristics of differential & difference LTI systems  
  • Midterm #1 (Friday of the 5th week) | |
| 6    |  
  • **Fourier Series (FS) (3 lectures)**  
  − Definition and examples  
  − Convergence and existence of FS representation  
  − Power spectrum of periodic signals and steady-state response of LTI systems to a periodic signal | Chapter 4 |
| 7    |  
  • **Fourier Transform (FT) (3 lectures)**  
  − Definition and examples  
  − Filtering concept | Chapter 5 |
| 8    |  
  • **Discrete-Time Fourier Series (DTFS) (2 lectures)**  
  − Midterm #2 (Friday of the 8th week) | Chapter 12 |
| 9    |  
  • **Discrete-Time Fourier Transform (DTFT) (2 lectures)**  
  • **Properties of Fourier Representations (2 lectures)**  
  − Linearity  
  − Symmetry  
  − Convolution  
  − Differentiation in time and frequency  
  − Time and frequency shift  
  − Multiplication  
  − Parseval’s relationship  
  − Duality | Chapter 12  
Chapters 4, 5, 12 |
| 10   |  
  • **Fourier representations applied to mixed signal classes (2 lectures)**  
  − Fourier transform of impulse train and its applications  
  − Fourier transform representations of periodic and discrete-time signals  
  • Review (1 lecture) | Chapters 4, 5, 12 |