EXPANDED COURSE DESCRIPTION
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Lassonde School of Engineering
Electrical Engineering Computer Science
LE / EECS 3451 4.0 SECTION E
SIGNALS AND SYSTEMS
FALL 2017 / WINTER 2018

Last Modified Date: 08/23/2017

COURSE CALENDAR DESCRIPTION
An introduction to the mathematical background in signals and systems; signal and image processing: sampling, discrete Fourier transform, filtering; linear system theory; Kalman filtering; feedback. Three lecture hours; three supervised laboratory hours. One term. Four credits. Prerequisites: General prerequisite; LE/EECS 2030 3.00 or LE/EECS 1030 3.00; LE/EECS 2021 4.00, SC/MATH 1310 3.00. Course credit exclusions: LE/SC/CSE 3451 4.00, SC/EATS 4020 3.00, SC/MATH 4130B 3.00, SC/MATH 4830 3.00, SC/PHYS 4060 3.00. (NOTE: The General Prerequisite is a cumulative GPA of 4.50 or better over all major EECS courses. EECS courses with the second digit “5” are not major courses.)

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Hooshyar, Ali</td>
<td>Sec. E / LECT / F</td>
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TOPICS AND CONCEPTS
The study of computer vision, graphics and robotics requires background in the concept of discrete signals, filtering, and elementary linear systems theory. Discrete signals are obtained by sampling continuous signals. Starting with a continuous time signal, students will review the concept of a discrete signal, the conditions under which a continuous signal is completely represented by its discrete version, and discuss the analysis and design of linear time-invariant systems. In particular, frequency selective filters in both discrete and continuous time domain will be developed. An accompanying lab will cover applications of the concepts covered in the lectures to practical problems such as speech and image processing.

The following topics will be covered:
• Continuous and discrete time signals
• Linear time-invariant systems
• Fourier analysis in continuous time
• Fourier analysis in discrete time
• Sampling
• Laplace transform
• Z transform
• Linear feedback systems
• Design of Continuous and discrete time frequency selective filters.

Course Learning Outcomes
After successful completion of the course, students should be able to:
• Explain how continuous and discrete-time signals can be represented in both time and frequency domains
• Represent linear systems both as systems of differential/difference equations and in terms of frequency response
Describe and use the principles of linear time invariant systems and the properties of Fourier and Laplace transforms
• Analyze the effects of discrete-time representation of continuous signals
• Design, build and measure continuous and discrete time frequency selective filters

**Required Textbook**

**Grades**
The weight distribution of the course components is as follows:
• 10% - Assignments
• 10% - Quizzes
• 25% - Lab Projects
• 15% - Midterm
• 40% - Final Exam

**ACADEMIC INTEGRITY LINKS**
• Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
• Academic Integrity - http://lassonde.yorku.ca/academic-integrity

**STUDENT LINKS**
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
• Academic Accommodation for Students with Disabilities - http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/
• Counselling and Disability Services - http://cds.info.yorku.ca/

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.
**Moodle @ York University**