Department of Electrical and Computer Engineering

COURSE OUTLINE

ELEC 459/534 – Applications of Digital Signal Processing Techniques

Term - SPRING 2015 (201501)

Instructor

Dr. W.-S. Lu
Phone: 8692
E-mail: wslu@ece.uvic.ca

Office Hours

Days: Wednesdays
Time: 14:40 – 16:40
Location: EOW 427

Lectures

A01 / CRN 21104 (21125 for ELEC 534)
Days: Tuesdays, Wednesdays, Fridays
Time: 11:30 – 12:20
Location: ELL 162

Labs **Location: ELW B326**

B-Section(s):	Days:	Time(s):
B01/CRN 21106	Tuesdays	14:30-17:20

Labs are on Jan. 27, Feb. 17, Mar. 03, Mar. 17.

Required Text

Title: Lecture Notes for ELEC 459/534
Author: W.-S. Lu
Publisher: Course Pack at UVic Bookstore
Year: September 2014

Optional Text

Title:
Author:
Publisher:
Year:

References:

Assessment:

Assignments:	10 %	
Labs (ELEC 459, do Experiments 2, 3, 5, 6))	15 %	
Labs and Project (ELEC 534, do Experiments 2, 3, 5, 6)	15 %	
Mid-term	20 %	Date: Feb. 18, Wednesday.
Final	55 %	

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

Due Dates for Assignments:

Assignment 1: Jan. 16
Assignment 2: Jan. 23
Assignment 3: Feb. 3
Assignment 4: Feb. 17
Assignment 5: Feb. 24
Assignment 6: Mar. 6
Assignment 7: Mar. 17

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

Passing Grades	Grade Point Value	Percentage for Instructor Use Only	
A+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	
C+ C	3 2	65 – 69 60 – 64	
D	1	50 – 59	
Failing Grades	**Grade Point Value**	**Percentage for Instructor Use Only**	**Description**
E	0	0 - 49	Fail, *Conditional supplemental exam. (For undergraduate courses only)
F	0	0 – 49	Fail, no supplemental.
N	0	0 – 49	Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.

**Assignment of E grade will be at the discretion of the Course Instructor.*

The rules for supplemental examinations are found on page 80 of the current 2014/15 Undergraduate Calendar.

Term in which E Grade Was Obtained	Application Deadline for Supplemental Exam	Supplemental Exam Date
First term of Winter Session (Sept – Dec)	February 28 in the following term	First week of following May
Second term of Winter Session (Jan – Apr)	June 30 in the following term	First week of following September
Summer Session (May – Aug)	October 31 in the following term	First week of following January

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

Course Description

1. Course Objectives

To learn the structure, principles, implementation, and applications of digital signal processing systems.

2. Learning Outcomes

Working knowledge of signal sampling, digital filtering and signal interpolation; working knowledge of FFT, DCT, two-channel based filter banks and adaptive filtering; working knowledge DCT based JPEG, adaptive system identification and channel estimation techniques, and restoration and compression of audio signals and digital images.

3. Syllabus

Introduction	1
Motivation and structure of DSP systems.	
Sampling and Aliasing	3
The Shannon Theorem. Anti-aliasing Filtering. Sampling of bandpass signals. Oversampling.	
Analysis of Discrete Signals	4
z transform, Discrete Fourier transform, and Discrete cosine transform	
Digital Filters and Filter Banks	8
FIR filters. IIR filters. Filter banks. Applications.	
Signal Interpolation	7
Lagrange polynomial. Upsampling-lowpass-filtering method. FFT-based method.	
De-Noising and Compression of Digital Signals	5
Subband denoising. Noise removal by subspace methods. Subband coding. Examples and case studies.	
Adaptive Filtering	7
General structure of adaptive systems. Wiener filters. Steepest descent and LMS algorithms. Applications.	

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the ECE Chair by email or the ECE Chair's Secretary eceasst@uvic.ca to set up an appointment.

Accommodation of Religious Observance

See http://web.uvic.ca/calendar2014/GI/GUPo.html

Policy on Inclusivity and Diversity

See http://web.uvic.ca/calendar2014/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult

http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity.