UVic Department of Electrical and Computer Engineering

COURSE OUTLINE
ELEC459/534 Applications of Digital Signal Processing Techniques
Spring 2014

Instructor:
Dr. W.-S. Lu
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E-mail: wslu@ece.uvic.ca
URL: www.ece.uvic.ca/~wslu

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

Lectures:
Section(s): A01/CRN 21120 for ELEC 459
A01/CRN 21141 for ELEC 534
Days: Tuesdays, Wednesdays, and Fridays
Time: 11:30 – 12:20
Location: ECS 124

Labs:
Days: R
Time: 14:30 – 17:20
Location: ELW B326

Required Text:
Title: Lecture Notes
Author: W.-S. Lu
Publisher: Course-pack at UVic Bookstore
Revised: September 2013

Assessment:
Assignments: 10%
Labs (for ELEC 459) (do Labs 2, 3, 5, 6) 15%
Labs & Project (for ELEC 534) (do Labs 2, 3, 5, 6) 15%
Mid-term 20% Date: Feb. 25 (Tuesday)
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. 17
Assignment 2: Jan. 24
Assignment 3: Feb. 4
Assignment 4: Feb. 18
Assignment 5: Feb. 25
Assignment 6: Mar. 7
Assignment 7: Mar. 18
The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

<table>
<thead>
<tr>
<th>Passing Grades</th>
<th>Grade Point Value</th>
<th>Percentage for Instructor Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>9</td>
<td>90 – 100</td>
</tr>
<tr>
<td>A</td>
<td>8</td>
<td>85 – 89</td>
</tr>
<tr>
<td>A-</td>
<td>7</td>
<td>80 – 84</td>
</tr>
<tr>
<td>B+</td>
<td>6</td>
<td>77 – 79</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>73 – 76</td>
</tr>
<tr>
<td>B-</td>
<td>4</td>
<td>70 – 72</td>
</tr>
<tr>
<td>C+</td>
<td>3</td>
<td>65 – 69</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>60 – 64</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>50 – 59</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Failing Grades</th>
<th>Grade Point Value</th>
<th>Percentage for Instructor Use Only</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>0</td>
<td>35 - 49</td>
<td>Fail, conditional supplemental exam. (For undergraduate courses only)</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0 – 49</td>
<td>Fail, no supplemental.</td>
</tr>
<tr>
<td>N</td>
<td>0</td>
<td>0 – 49</td>
<td>Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.</td>
</tr>
</tbody>
</table>

The rules for supplemental examinations are found on page 80 of the current 2013/14 Undergraduate Calendar.

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

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**
Motivation and structure of DSP systems.

**Sampling and Aliasing**
Oversampling.

**Analysis of Discrete Signals**
- z transform, Discrete Fourier transform, and Discrete cosine transform

**Digital Filters and Filter Banks**

**Signal Interpolation**

**De-Noising and Compression of Digital Signals**
- Examples and case studies.

**Adaptive Filtering**

**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 to set up an appointment.

**Accommodation of Religious Observance**
See [http://web.uvic.ca/calendar2013/GI/GUPo.html](http://web.uvic.ca/calendar2013/GI/GUPo.html)

**Policy on Inclusivity and Diversity**
See [http://web.uvic.ca/calendar2013/GI/GUPo.html](http://web.uvic.ca/calendar2013/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/current/undergrad/index.php#section0-25](http://www.uvic.ca/engineering/current/undergrad/index.php#section0-25)
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/calendar2013/FACS/UnIn/UARE/PoAcI.html](http://web.uvic.ca/calendar2013/FACS/UnIn/UARE/PoAcI.html) for the UVic policy on academic integrity.

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**Plagiarism detection software may be used to aid the instructor and/or TA’s in the review and grading of some or all of the work you submit.**