ECE 310 – Digital Signal Processing 1

Spring 2019

Instructor  
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Office Hours  
Days: Everyday  
Time: Drop in but phone first  
Location: EOW 431

Course Objectives  
Generation of discrete-time signals through the sampling process and their spectral representation. Mathematical representation and properties of digital signal processing (DSP) systems. Typical DSP systems, e.g., digital filters and applications. The $z$-transform and its relation to the Laurent series. Evaluation of the inverse $z$ transform using complex series and contour integrals. Application of the $z$ transform for representation and analysis of DSP systems. The processing of continuous time signals using DSP systems. The discrete-?Fourier transform and the use of fast Fourier transforms for its evaluation. Introduction to the design of DSP systems.

Learning Outcomes  
1. Understand linearity, time invariance and convolution  
2. Explain relation between continuous- and discrete-time Fourier transform  
3. Understand $z$-transform and its use in solving problems  
4. Evaluate forward and inverse $z$ and Fourier transforms for discrete signals  
5. Demonstrate competency in working with both time- and frequency-domain representations of discrete-time sampled signals  
6. Design a discrete-time filtering algorithm based on given requirements  
7. Use MATLAB effectively for analysis and design of sampled digital signals  
8. Explain significance of sampling theorem and use it in the context of discrete-time processing of continuous-time signals

Syllabus  
Chapter 1  Signals  
Chapter 2  Sinusoidal Signals  
Chapter 3  Sampling and Aliasing  
Chapter 4  Discrete-Time Systems  
Chapter 5  Discrete-Time Fourier transform  
Chapter 6  Discrete Fourier transform  
Chapter 7  $z$-Transform  
Chapter 8  Digital Filters  
Chapter 10  Discrete-Time Systems

Lectures  
Days: Tue, Wed, Fri  
Time: 10:30 – 11:20  
Location: ECS 125
Required Text


Assessment

<table>
<thead>
<tr>
<th>Activity</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>0 %</td>
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<tr>
<td>Two Quizzes (10% each)</td>
<td>20%</td>
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<tr>
<td>Mid term</td>
<td>30%</td>
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<tr>
<td>Final</td>
<td>50%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
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Tentative Midterm dates are to be found at:

http://www.ece.uvic.ca/-fayez/courses/310/schedule.html

Note:

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar. https://web.uvic.ca/calendar2019-01/undergrad/info/regulations/grading.html

There will be no supplemental examination for this course.

https://web.uvic.ca/calendar2019-01/undergrad/info/regulations/exams.html#

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 Chair of the Department by email or the Chair’s Assistant to set up an appointment.

Accommodation of Religious Observance:


Policy on Inclusivity and Diversity:

https://web.uvic.ca/calendar2019-01/general/policies.html

Standards of Professional Behaviour: You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.

https://web.uvic.ca/calendar2019-01/undergrad/info/regulations/academic-integrity.html

Equality: This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.
The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

**Course Lecture Notes:** Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

**Sexualized Violence Prevention and Response at UVic**

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:

- **Where:** Sexualized violence resource office in EQHR; Sedgewick C119
- **Phone:** 250.721.8021
- **Email:** svpcoordinator@uvic.ca
- **Web:** www.uvic.ca/svp