University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ECE 310 Digital Signal Processing I

Term – Summer 2018 (201805)

Instructor

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Office Hours

Days:
Time:
Location:

Course Objectives

- Understand the basics of discrete time signal processing.
- Present the basic mathematics for sampling including which signals can be uniquely represented with samples and the source of the ambiguity.
- Describe linear time invariant systems and how these systems can be used to process signals for engineering applications.
- Introduce the mathematical transform techniques used to simplify signal processing calculations. Show how these transforms can be used for designing signal processing systems.
- Extend the time/frequency relationships for continuous time signals to sampled/discrete-time signals.

Learning Outcomes

- State the basic properties of the Laurent Series and Z transforms and use these properties in problem solving.
- Evaluate forward/inverse Fourier and Z transforms of discrete signals.
- Identify how the properties of convolution and the computation of the convolution of discrete signals is similar and different from convolution of continuous time signals.
- Explain the significance of the sampling theorem and use it in the context of discrete-time processing of continuous time signals with practical filtering techniques.
- Explain the relationships between the continuous time Fourier transform, Discrete-time Fourier transform, Z-transform, and the Discrete Fourier Transform.
- Apply the properties such as linearity, time invariance, causality, memory, invertibility, and BIBO stability to problem solving for discrete time systems.
- Demonstrate competency in working with both time- and frequency-domain representations of discrete-time sampled signals and systems.
- Design a discrete time filtering algorithm based on given requirements.
- Use MATLAB effectively for the analysis of sampled digital signals and for the design of basic digital systems

Syllabus

1. Introduction
2. Sinusoids
3. Spectrum representation
4. Sampling and aliasing
5. FIR filters
6. Frequency response of FIR filters

7. Discrete-time Fourier transform (DTFT)
8. The discrete Fourier transform (DFT)
9. Z-Transform
10. IIR Filters

A-Section(s):	A01 & A02 / CRN 30272 & 30273
Days:	Monday/Thursday
Time:	10:00-11:20
Location:	ECS123

Required Text

Title:	DSP First (Second Edition)
Authors:	J.H. McClellan, R.W. Schafer, M.A. Yoder
Publisher:	Pearson Education, Ltd.
Year:	2016

References:

Assessment:

Assignments:	20 %	Due Dates: TBD
Mid-term	40 %	Date: June 7, July 5
Final Exam	40 %	

Note: Failure to pass the final exam will result in a failing grade for the course.

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/calendar2018-05/undergrad/info/regulations/grading.html

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.
https://web.uvic.ca/calendar2018-05/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:
https://web.uvic.ca/calendar2018-05/undergrad/info/regulations/religious-observanc.html

Policy on Inclusivity and Diversity:
https://web.uvic.ca/calendar2018-05/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/calendar2018-05/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.