



University  
of Victoria



Course Outline

## ECE260: Continuous-Time Signals and Systems

### Course Dates

CRN(s):	Section A01 CRN: 11010 Section A02 CRN: 11011
Term:	2023
Course Start:	2023-09-06
Course End:	2023-12-20
Withdrawal with 100% reduction of tuition fees:	2023-09-19
Withdrawal with 50% reduction of tuition fees:	2023-10-10
Last day for withdrawal (no fees returned):	2023-10-31

### Scheduled Meeting Times (M=Mon, T=Tue, W=Wed, R=Thu, F=Fri)

Section:	Location:	Classes Start:	Classes End:	Days of week:	Hours of day:	Instructor:
A01	HSD A240	2023-09-06	2023-12-04	TWF	13:30-14:20	Michael Adams
A02	HSD A240	2023-09-06	2023-12-04	TWF	13:30-14:20	Michael Adams
T01	ELW B215	2023-09-11	2023-12-04	M	13:30-14:20	Michael Adams
T02	ELW B215	2023-09-11	2023-12-04	R	14:30-15:20	Michael Adams
T03	ELW B215	2023-09-11	2023-12-04	M	14:30-15:20	Michael Adams

### Instructor(s)

Name: **Michael Adams**  
 Office: EOW 311  
 Phone: (250) 721-6025  
 Email: frodo at uvic dot ca  
 Office Hours: **TBD**

### Specification of Dates/Times

Unless explicitly indicated otherwise, all dates and times are specified using local time in Victoria, BC, Canada (i.e., Pacific Time). This statement applies in totality to all written and verbal communication for the course, including but not limited to: assignment submission deadlines, the dates/times for exams, lecture and tutorial times, office hours, and any dates/times specified on handouts, the course web site, and the Brightspace site.

### Instructor

Name: Michael Adams  
 Office: EOW 311  
 Email: mdadams at ece dot uvic dot ca  
 Web: <https://www.ece.uvic.ca/~mdadams>  
 YouTube: [iamcanadian1867](https://www.youtube.com/channel/UCiamcanadian1867)  
 GitHub: [mdadams](https://github.com/mdadams)  
 Twitter: [mdadams16](https://twitter.com/mdadams16)

### Course Web Site

Home Page: <https://www.ece.uvic.ca/~mdadams/courses/ece260>

Username: ece260

Password: as announced on the Brightspace site at <https://bright.uvic.ca/d2l/le/news/311722/229204/view>

The course web site is the **primary online source of information** for the course.

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## Brightspace Site

Home Page: <https://bright.uvic.ca/d2l/home/311722>

Although the course has a Brightspace site, the primary online source of information for the course is the course web site (introduced above), **not the Brightspace site**. The Brightspace site is mainly intended to be used for:

1. posting important course announcements and other information, such as the username and password to be used for accessing password-protected areas of the course web site;
2. submitting (and grading) assignments; and
3. providing students with a means to review their grades in the course.

Students are responsible for reading all announcements posted on the Brightspace site in a timely fashion. **Students should enable notifications (via email) for new announcements and other events on the Brightspace site** in order to stay abreast with what is happening in the course.

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## Teaching Assistants (TAs)

The tutorial and marker teaching assistants (TAs) are listed on the course web site along with their contact information. In particular, this information can be found in the section of the course web site titled "[Teaching Assistants](#)".

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## General Teaching Strategy

This course employs a **flipped classroom** approach to teaching. With this approach, students are first introduced to the course materials through prerecorded video lectures prepared by the instructor. Then, students are given the opportunity to engage with the course materials in interactive lecture sessions held by the instructor during the lecture time slots. For more details on how the lecture sessions will be run, see the section of this document titled "[Lecture Sessions](#)".

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## Pandemic Contingency Plan

This document has been prepared on the assumption that face-to-face meetings will be feasible for the course. In the event that face-to-face meetings turn out not to be feasible (e.g., due to public health measures resulting from a pandemic), the following changes to this course outline will apply:

1. any lecture sessions that would normally be held face-to-face in the lecture time slots will instead be offered online (during those same time slots);
  2. any tutorial sessions that would normally be held face-to-face will instead be offered online (with the tutorial time unchanged);
  3. any exams that would normally be conducted face-to-face in a classroom will instead be conducted online (with the exam dates/times remaining unchanged to whatever extent is possible); and
  4. online exams will be conducted in accordance with the rules and procedures described in the Online Exams Handout, which would be made available in the section of the course web site titled "[Exams](#)".
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## Online Meetings

Some meetings in the course may be held online. For details on how to attend online meetings, see the section of the course web site titled "[Online Meetings](#)".

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## Lecture Sessions

Time/Location: The time/location of the lecture sessions is given in the information provided at the beginning of this document.

The lecture time slots will be used by the instructor to hold interactive lecture sessions that are intended to assist students in learning the course materials more effectively. The lecture sessions will employ one of the following two formats:

1. face-to-face with provisions for online attendance
2. face-to-face only (i.e., no provisions for online attendance)

If the instructor has the hardware and software necessary in order to accommodate online attendance, the first of these formats will be used. Otherwise, the second format will be employed as a fallback. (If online attendance is supported, details on how to attend online meetings can be found in the section of this document titled ["Online Meetings"](#).) How exactly the lecture sessions will be utilized will depend on the needs, interests, and preferences of the students. Some of potential uses of these sessions include (but are not limited to):

- providing a brief summary of course materials covered;
- discussing aspects of the course materials that are typically more problematic for students and addressing common misunderstandings;
- working through additional examples;
- answering student questions about the course materials; and
- giving software demonstrations to illustrate practical applications of the theory covered in the course.

The first lecture session will be used to provide an overview of the course and address many administrative matters. **All students are required to attend this first lecture session.**

Since the core course content is delivered through prerecorded video lectures, students are **not required** to attend the lecture sessions, **except when explicitly indicated by the instructor**. This said, however, each student is **strongly encouraged** to attend at least some of the lecture sessions, as this will very likely lead to an improved understanding of the course materials.

Normally, **the lecture sessions will not be recorded**. There are several important reasons for this:

- the main objective of the lecture sessions is to provide an opportunity for the instructor and students to engage with one another interactively in real time, and recording the lecture sessions would run completely contrary to this objective;
- recording any interactions with students raises many privacy concerns which are best avoided whenever possible;
- some students are much less likely to participate (or may not participate at all) in lecture sessions if they are being recorded; and
- all of the core instructional content for the course is already available in video format so none of the material covered in the lecture sessions is essential for the course.

For more information on lecture sessions, see the section of the course web site titled ["Lecture Sessions"](#).

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## Office Hours

Office-hour sessions will be held by the instructor in order to provide extra help with the course materials as well as discuss other course-related matters with students. These sessions will be offered **online only**.

For more information regarding office-hour sessions, including the schedule for these sessions, refer to the section of the course web site titled ["Office Hours"](#). (For details on how to attend online meetings, see the section of this document titled ["Online Meetings"](#).)

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## Tutorial Sessions

Time/Location: The time/location of tutorial sessions is given in the information provided at the beginning of this document.

The tutorial time slots will be used by the tutorial TAs to hold sessions in order to help students with course materials. These sessions are to be held **face-to-face**. A TA may also allow for online (in addition to face-to-face) attendance of tutorial sessions, if feasible to do so.

For more information on tutorial sessions, see the section of the course web site titled ["Tutorial Sessions"](#). (For details on how to attend online meetings, see the section of this document titled ["Online Meetings"](#).)

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## Video Lectures

The core instructional content for the course will be delivered in the form of prerecorded video lectures. Information about these video lectures can be found in the section of the course web site titled "[Video Lectures](#)".

**Students are responsible for all material covered in the prerecorded video lectures.**

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## Required Texts/Materials

The following references are required for the course:

1. Textbook
  - Michael D. Adams, Signals and Systems, Edition 5.0, University of Victoria, Victoria, BC, Canada, Dec. 2022, ISBN 978-1-990707-00-1 (PDF).
2. Lecture Slides
  - Michael D. Adams, Lecture Slides for Signals and Systems, Edition 5.0, University of Victoria, Victoria, BC, Canada, Dec. 2022, ISBN 978-1-990707-02-5 (PDF).

The above textbook has a corresponding web site, whose URL is:

- <https://www.ece.uvic.ca/~mdadams/sigsysbook>

The textbook and lecture slides can be obtained in PDF format (free of charge) from this web site. Print copies of these items can be obtained from the University Bookstore.

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## Optional Texts/Materials

The following textbook can be considered as a source of additional explanations and extra worked-through example problems:

- A. V. Oppenheim and A. S. Willsky with S. H. Nawab, Signals and Systems, 2nd edition, Prentice-Hall, Upper Saddle River, NJ, USA, 1997, ISBN 0-13-814757-4.
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## Exams

All exams in the course are written **face-to-face**. Each midterm exam is scheduled in one of the lecture time slots.

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## Computer and Software Requirements

Each student is required to have access to a computer with the following software installed:

- Zoom. The Zoom software is required for participating in any online meetings held in the course.
- MATLAB. Students will need to use the MATLAB software in order to complete some assignments.

For additional information on how to obtain the MATLAB software, refer to the section of the course web site titled "[MATLAB](#)".

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## Course Announcements and Other Important Course Information

Important course announcements are often sent to students via email. Therefore, **students are responsible for checking their email regularly**.

Many important documents for the course are available from the course web site. Some of these documents include the following:

- Online Meetings Handout (See section titled "[Online Meetings](#)")
  - Video-Lecture Information Package (See section titled "[Video Lectures](#)")
  - Video-Lecture Schedule Handout (See section titled "[Video Lectures](#)")
  - Assignments Handout (See section titled "[Assignments](#)")
  - Course-Materials Bug-Bounty Program Handout (See section titled "[Course-Materials Bug-Bounty Program](#)")
  - Course-Materials Errata Handout (See section titled "[Course-Materials Bug-Bounty Program](#)")
  - Optional Textbook Handout (See section titled "[Optional Texts/Materials](#)")
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## Description and Objectives

This course provides a basic introduction to continuous-time signals and systems. The course is intended to teach students mathematical techniques for the design and analysis of systems.

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## Topics

The topics covered by the course are as follows:

1. Signals and systems (6 hours):
    - basic definitions/concepts
    - review of complex analysis
    - signal properties
    - system properties
    - basic signal transformations
    - elementary signals
    - signal representations using elementary signals
  2. Linear time-invariant (LTI) systems (6 hours):
    - convolution
    - properties of convolution
    - representation of signals using impulses
    - impulse response and convolution representation of LTI systems
    - properties of LTI systems
    - response of LTI systems to complex exponential signals
  3. Fourier series (5 hours):
    - Fourier series definition
    - finding Fourier series representations of signals
    - convergence of Fourier series
    - properties of Fourier series
    - Fourier series and frequency spectra
    - Fourier series and LTI systems
  4. Fourier transform (8 hours):
    - Fourier transform definition
    - convergence of Fourier transform
    - Fourier transform properties
    - Fourier transform of periodic signals
    - frequency spectra of signals
    - frequency response of LTI systems
    - applications
  5. Laplace transform (8 hours):
    - Laplace transform definition
    - relationship between Laplace transform and Fourier transform
    - region of convergence
    - finding the inverse Laplace transform
    - properties of the Laplace transform
    - analysis of systems using the Laplace transform
    - solving differential equations using the unilateral Laplace transform
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## Learning Outcomes

Upon completion of the course, a student should be able to:

1. define various properties of systems (such as linearity, time invariance, causality, memory, invertibility, and BIBO stability) and determine if a system has each of these properties;
2. identify basic properties of convolution and compute the convolution of functions;
3. explain the significance of convolution in the context of LTI systems;
4. state the basic properties of the Fourier and Laplace transforms and use these properties in problem solving;
5. compute forward/inverse Fourier and Laplace transforms of functions and find Fourier series representations of periodic functions;
6. use the Fourier transform and/or Laplace transform to design and analyze simple systems (e.g., filtering/equalization systems, amplitude modulation systems, and feedback control systems);
7. use the Laplace transform to solve differential equations;
8. demonstrate competency in working with both time- and frequency-domain representations of signals and systems;

9. explain the relationships amongst the various representations of LTI systems (e.g., differential equation, frequency response, transfer function, impulse response);
10. identify basic types of frequency-selective filters (i.e., lowpass, highpass, and bandpass);
11. explain the fundamentals of sampling and the implications of the sampling theorem; and
12. use MATLAB effectively for problem solving.

## Assessment

Weight (%)	Component
10	Assignments (†)
90	Exams (‡)

Course-Materials Bug-Bounty Program Bonus (★): 1% (of course mark)

(†) Note: The assignments are **equally weighted**. The submission deadlines for assignments will be posted on the course web site and/or Brightspace site. **Late assignments will not be accepted and will receive a mark of zero.**

(‡) Note: The exams are **not equally weighted**. There are five exams with the relative weights 5/24, 5/24, 5/24, 5/24, and 4/24, where **the last exam is the one with the lower weight**. The dates/times for exams will be posted on the course web site and/or Brightspace site. All exams will be scheduled during the lecture time slots. The last exam will be scheduled in either the second-last or last lecture time slot. All exams are **closed book**. Calculators are not permitted in exams.

(★) Note: See the handout titled "Course-Materials Bug-Bounty Program" for more details.

## Plagiarism Detection Tools

Plagiarism detection software may be used to aid the instructor and/or teaching assistants in the review and grading of some or all student work.

## Supplemental Exams

There will be **no supplemental examination** for this course.

## Percentage to Letter-Grade Conversion

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. See:

<https://www.uvic.ca/calendar/archives/202309/undergrad/#/policy/S1AAgoGuV>

## General Information

**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://www.uvic.ca/calendar/archives/202309/undergrad/index.php#/policy/r1q0gofdN>

**Policy on Inclusivity and Diversity:** Engineering: <https://www.uvic.ca/ecs/info-for/diversity-and-inclusion-supports/index.php#ipn-within-our-faculty> Academic Calendar:

<https://www.uvic.ca/calendar/archives/202309/undergrad/index.php#/policy/HkQ0pzdAN>

**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/ecs/assets/docs/student-forms/professional-behaviour.pdf>

**Academic Integrity** 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://www.uvic.ca/calendar/archives/202309/undergrad/index.php#/policy/Sk\\_0xsM\\_V](https://www.uvic.ca/calendar/archives/202309/undergrad/index.php#/policy/Sk_0xsM_V)

**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 an appropriate accommodation. Alternatively, you may want to contact the Centre for Accessible Learning located in the Campus Services Building: <https://www.uvic.ca/services/cal/>. The University of Victoria is committed to promoting, providing, and protecting a positive, 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 U Vic 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](http://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](mailto:svpcoordinator@uvic.ca) Web: [www.uvic.ca/svp](http://www.uvic.ca/svp)

**Office of the Ombudsperson:** The Office of the Ombudsperson is an independent and impartial resource to assist with the fair resolution of student issues. A confidential consultation can help you understand your rights and responsibilities. The Ombudsperson can also clarify information, help navigate procedures, assist with problem-solving, facilitate communication, provide feedback on an appeal, investigate and make recommendations. Phone: 250-721-8357. Email: [ombuddy@uvic.ca](mailto:ombuddy@uvic.ca). Web: <https://uvicombudsperson.ca/>.