

ECE260: Continuous-Time Signals and Systems

Course Dates

CRN(s):	Section A01 CRN: 10971 Section A02 CRN: 10972
Term:	Fall 2021
Course Start:	2021-09-08
Course End:	2021-12-20
Withdrawal with 100% reduction of tuition fees:	2021-09-21
Withdrawal with 50% reduction of tuition fees:	2021-10-12
Last day for withdrawal (no fees returned):	2021-10-31

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	2021-09-08	2021-12-06	TWF	13:30-14:20	Michael Adams
A02	HSD A240	2021-09-08	2021-12-06	TWF	13:30-14:20	Michael Adams
T01	ELW B215	2021-09-13	2021-12-03	M	13:30-14:20	Michael Adams
T02	ELW B215	2021-09-13	2021-12-03	R	14:30-15:20	Michael Adams
T03	ELW B215	2021-09-13	2021-12-03	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)
Twitter: [mdadams16](https://twitter.com/mdadams16)

Teaching Assistants (TAs)

The tutorial and marker teaching assistants (TAs) are listed on the course web site along with their contact information. See the "[Teaching Assistants](#)" section of the course web site.

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 office-hour sessions held by the instructor during the lecture time slots. The particular format of these sessions will vary depending on the needs, interests, and preferences of the students. Some of the potential uses of these sessions include (but are not limited to):

- answering student questions about the course materials;
 - working through additional examples;
 - discussing more difficult aspects of the course materials; and
 - giving software demonstrations to illustrate practical applications of the theory covered in the course.
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COVID-19 Pandemic Contingency Plan

Due to the ongoing COVID-19 pandemic, there is still some uncertainty as to whether ECE 260 will be able to utilize face-to-face meetings. This course outline has been prepared under the assumption that face-to-face meetings will be feasible for ECE 260. In the event that face-to-face meetings turn out not to be feasible, the following changes to this course outline will apply:

1. any office-hour sessions that would normally be held face-to-face in the free 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); 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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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/165122/70353/view>

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

Brightspace Site

Home Page: <https://bright.uvic.ca/d2l/home/165122>

Although the course has a Brightspace site, the primary online source of information for the course is the course web site (introduced above), **not Brightspace**. 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.

Online Meetings

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

Office Hours

Office-hours sessions will be held by the instructor in all lecture time slots that are not used for other purposes (such as exams). These sessions will use some combination of the following formats as well as possibly others:

- face-to-face in-classroom with provisions for online attendance
- face-to-face in-classroom only (i.e., without provisions for online attendance)
- online only

The particular formats that are in use at any given time can be found in the ["Office Hours"](#) section of the course web site.

(For details on how to attend online meetings, see the section of this document titled ["Online Meetings"](#).)

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 ["Video Lectures"](#) section of the course web site.

Lectures

The lecture time slots will be used for a variety of purposes, including (but not limited to): office hours and exams. The first lecture time slot will be used for a face-to-face in-classroom course introduction.

Tutorials

The tutorial time slots will be used by the tutorial TAs to hold sessions in order to help students with course materials. For a given tutorial section, the sessions are to be held using one of the following formats:

- face-to-face in-classroom with provisions for online attendance **provided that this is feasible with the hardware and software available to the TA**
- face-to-face in-classroom only (i.e., without provisions for online attendance)
- online only

The decision of which format to use for a particular tutorial section will be made by the tutorial TA in consultation with their students.

For more information on tutorials, see the ["Tutorials"](#) section of the course web site.

(For details on how to attend online meetings, see the section of this document titled ["Online Meetings"](#).)

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 "[MATLAB](#)" section of the course web site.

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.

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

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.
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Required Texts/Materials

The following references are required for the course:

1. Textbook
 - Michael D. Adams, Signals and Systems, Edition 3.0, University of Victoria, Victoria, BC, Canada, 2020, ISBN 978-1-55058-673-2 (print), ISBN 978-1-55058-674-9 (ebook).
2. Lecture Slides
 - Michael D. Adams, Lecture Slides for Signals and Systems, Edition 3.0, University of Victoria, Victoria, BC, Canada, 2020, ISBN 978-1-55058-677-0 (print), ISBN 978-1-55058-678-7 (ebook).

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

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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Other Important Documents Available from the Course Web Site

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](#)")

Importance of Email

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

Lecture Attendance

Students are responsible for all material covered in live and prerecorded lectures. If a student is unable to attend a live lecture due to illness or some other reason, the student is solely responsible for any information missed (including any course-related announcements).

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 and online locations 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/202109/undergrad/#!/policy/S1AAgoGuV?bc=true&bcCurrent=14%20-%20Grading&bcltemType=policies>

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.

Course Withdrawal Deadlines:

- September 21, 2021: Withdrawal with 100% reduction of tuition fees
- October 12, 2021: Withdrawal with 50% reduction of tuition fees
- October 31, 2021: Last day for withdrawal (no fees returned)

Accommodation of Religious Observance:

<https://www.uvic.ca/calendar/archives/202109/undergrad/#!/policy/r1q0gofdN>

Policy on Inclusivity and Diversity:

Engineering: <https://www.uvic.ca/engineering/about/equity/index.php>

Academic Calendar: [https://www.uvic.ca/calendar/archives/202109/undergrad/#!/policy/HkQ0pzdAN?](https://www.uvic.ca/calendar/archives/202109/undergrad/#!/policy/HkQ0pzdAN?bc=true&bcCurrent=General%20University%20Policies&bcGroup=%20General%20University%20Policies&bclItem=types=policies)

[bc=true&bcCurrent=General%20University%20Policies&bcGroup=%20General%20University%20Policies&bclItem=types=policies](https://www.uvic.ca/calendar/archives/202109/undergrad/#!/policy/HkQ0pzdAN?bc=true&bcCurrent=General%20University%20Policies&bcGroup=%20General%20University%20Policies&bclItem=types=policies)

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>

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/202109/undergrad/#!/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 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

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; Web: <https://uvicombudsperson.ca/>