University of Victoria
Faculty of Engineering | Electrical and Computer Engineering
Engineering Office Wing Room 448 PO Box 1700 STN CSC Victoria BC V8W 2Y2 Canada
T 250-721-6036 | ecesec@uvic.ca |

# COURSE OUTLINE

## ECE 299 – Introduction to Electrical and Computer Engineering Design

**SUMMER 2020** (202005)

**Instructor**

Dr. T. Ilamparithi
Phone: 250-721-8679
E-mail: ilampari@uvic.ca

**Office Hours**

Days: Fridays
Time: 10:00 AM to 12:00 Noon (PDT)
Platform: Zoom (link to be shared via CourseSpace)

**Course Objectives**

ECE 299, as the name suggests, is an introductory course that helps you familiarize with the steps involved in engineering design. With the help of a project rather than an exam, the course is intended to prepare you for the professional world by focusing on skills such as planning, prioritizing, testing, troubleshooting, and documentation. Further, the course provides an ideal opportunity to learn new software used in different industries. Finally, the course also inculcates basic skills such as reading a datasheet of a component, circuit simulation etc.

**Learning Outcomes**

By the end of the course, you shall be able to

- Read the datasheet of an electronic component and identify pertinent information.
- Build a circuit to multiplex LED 7-segment display.
- Program a microcontroller to drive LEDs and to receive inputs from push buttons.
- Design a layout for a printed circuit board (PCB) using KiCAD software.
- Using a software package, design a 3-D model of an enclosure.
- Formulate test procedures to validate the functions of the designed prototype.
- Prepare professional reports detailing the design activity.

**Syllabus**

The syllabus comprises of

- Introduction to basic electronics, circuits and testing
- Embedded programming and debugging
- Technical drawings
- Basics of project planning

**Lecture**

**A**-Section(s): A01 / CRN 30301
Days: Tuesdays (T), Wednesdays (W)
Time: (T) 1:30 PM to 03:20 PM (PDT); (W) 04:30 PM to 05:20 PM (PDT)
Platform: Zoom (Link to be shared via Coursespace)

**Laboratory**

**B**-Section(s): B01 / CRN 30302, B02 / CRN 30303, B03 / CRN 30304 & B04 / CRN 30305
Details will be shared via CourseSpace.

**Required Textbook**

N/A

Cost:

While there is no textbook for the course, students will be spending about $100 to get a printed circuit board manufactured and shipped.

**Online Course Delivery:**

As the course will be conducted online during this term, students will need to complete assignments/project/labs online. The students will require access to a computer with a monitor of at least 14" size and a high-speed wired internet connection to attend lectures and to participate in all activities associated with the course. The students will require to install the following software in their local machine:

(1) LTSpice
(2) KiCAD
(3) Eclipse IDE
(4) In addition, students need to create an account with a free online tool called *Autodesk TinkerCAD* (https://www.tinkercad.com/) to learn 3D CAD modelling. Students are strongly advised to use aliases and create new email addresses to access the tool.

Details to the exact versions of all the software tools along with the links to installation files will be shared via CourseSpace during the first week of classes.

**Assessment:**

Validating one's learning is important and hence in ECE 250, many opportunities will be provided to you to assess your learning. In order to ensure you have enough time to take appropriate corrective actions upon assessing, I propose the following periodic assessment scheme:

| | | |
|---|---|---|
| In class Quizzes | 4 x 2.5 = 10% | Dates: To be announced |
| Lab | 4 x 10 = 40% | Dates: Every week starting from 25th May |
| PCB | 1 x 10 = 10% | Date: To be announced |
| Project Report | 1 x 40 = 40% | Due: 2nd August by 5 PM |

I have furnished more details about each of the assessment scheme in Appendix A. Please take time to read through it.

**Important: All deadlines and schedules for this course will reference Pacific Daylight Time.**

**Note:**

Failure to complete all laboratory requirements will result in a grade of N being awarded 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://www.uvic.ca/calendar2020-05/undergrad/index.php#/policy/S1AAgoGuV?bc=true&bcCurrent=14%20-%20Grading&bcItemType=policies

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

https://www.uvic.ca/calendar2020-05/undergrad/index.php#/policy/SJ2Rxoz_N?bc=true&bcCurrent=13%20-%20Examinations&bcItemType=policies

**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:**

- May 16, 2020: Withdrawal with 100% reduction of tuition fees
- June 6, 2020: Withdrawal with 50% reduction of tuition fees
- July 1, 2020: Last day for withdrawal (no fees returned)

**Accommodation of Religious Observance:**
https://www.uvic.ca/calendar2020-05/undergrad/index.php#/policy/r1q0gofdN?bc=true&bcCurrent=10%20-%20Accommodation%20of%20Religious%20Observance&bcItemType=policies

**Policy on Inclusivity and Diversity:**
Engineering: https://www.uvic.ca/engineering/about/equity/index.php
Academic Calendar: https://www.uvic.ca/calendar2020-05/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/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/calendar2020-05/undergrad/index.php#/policy/Sk_0xsM_V?bc=true&bcCurrent=08%20-%20Policy%20on%20Academic%20Integrity&bcItemType=policies

**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 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/

**Course Evaluation:** Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey you will receive an email inviting you to do so. You will need to use your UVic Netlink ID to access the survey, which can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time but please be thinking about this important activity during the course.

**Continuous Feedback:** I am committed to a memorable learning experience for my students, and I will try my best to help out in whatever way I can. For that I need to receive your input. Oral/written feedback are welcome anytime during the term.

# Appendix A

**Assessment:**

As indicated in the course outline, I suggest the following periodic assessment scheme:

| | | |
|---|---|---|
| In class Quizzes | 4 x 2.5 = 10% | Dates: To be announced |
| Lab | 4 x 10 = 40% | Dates: Every week starting from 25th May |
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**In-class quizzes:**

The main objective of the quizzes is to ensure that each of you has understood the basics of the design activity. Some information about the in class quiz are:

**Time:** During lecture hour
**Date:** To be decided during the term
**Duration:** 30 minutes to 45 minutes
**Type of questions:** Detailed design activity involving software
**Restrictions:** No discussion with peers
**Accommodations:** You can refer to any resource such as notes, datasheet or internet
**Calculator:** Any type of calculator can be used
**Weightage**: Each quiz will have 2.5% weightage

In case you miss a quiz due to ill-health or an emergency, there will be a compensatory quiz.

**Lab:**

Labs form a vital part of the course. Labs are structured in a way to help you familiarize with different tools that are needed for the successful execution of the project. Thus, if you do well in the lab experiments there is a high chance of succeeding in the project. For each lab experiment, by working with your project team, you are expected to accomplish an objective and submit a detailed design report. As many of you would have completed ENGR 120 (Design & Communication), your lab reports are expected to inculcate the learnings from the Communication part of ENGR 120 course.

**Printed Circuit Board:**

As a part of the project, each team is expected to design a printed circuit board and get it manufactured. These manufactured printed circuit boards are to be shipped to the Electrical & Computer Engineering department for inspection. Highly experienced lab technicians will share their feedback about your team's PCB. The process of getting the PCB manufactured and shipped will involve about $100. Students are expected to share this cost amongst their team members.

**Final Project Report:**

At the end of the term, each project team is expected to submit an elaborate project report explaining the design activity. Details about the project report expectations will be shared around early July. As many of you would have completed ENGR 120 (Design & Communication), your final project reports are expected to inculcate the learnings from the Communication part of ENGR 120 course.