

COURSE OUTLINE

ECE 365 – Applied Electronics and Electrical Machines

Term – FALL 2020 (202009)

Instructor

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Office Hours

Days: Any day
Time: By email appointment
Platform: Zoom

Course Objectives

Electrical and electronics components have been an integral part of modern society for a while now. Contemporary researchers' focus on smart sensors, smart homes, smart grids, internet of things, artificial intelligence, augmented reality/virtual reality, power walls, electric transportation systems, 3-D printing, etc. indicates that a further growth in electrical and electronics components is inevitable. Consequently, it is important for a modern engineer, be it mechanical, civil, biomedical, or software engineer, to be familiar with the some of the key elements of electrical and electronics systems. ECE 365 provides an ideal opportunity to you, as an upcoming engineer, to get introduced to the foundational elements of electrical machines and electronics circuits. The primary objectives of the course are to:

- Introduction to the construction and operation of 1 phase transformers, dc and ac machines.
- Introduction to a few electronic devices and some of their applications.

Learning Outcomes

By enrolling in ECE 365 and actively involving yourself in the learning process, by the end of the term each of you shall be able to

- Explain the operating principle of transformer and rotating machines
- Represent transformers and rotating machines using their symbols and equivalent circuits
- Analyze transformers and rotating machines using their equivalent circuit parameters
- Compute various performance indices of transformers and electrical machines
- Draw the symbols and i-v characteristics of diodes and transistors
- List some of the applications of diodes, transistors and operational amplifiers
- Analyze a few circuits comprising of diodes, transistors and operational amplifiers

Syllabus

The syllabus comprises of:

Characteristics of electronic devices including diodes, bipolar junction transistors and operational amplifiers; analysis of practical electronic circuits such as rectifiers, voltage regulators, amplifiers and filters; fundamentals of electromechanical energy conversion; transformers and actuators; operating principles of rotating electric machines: dc machines and ac machines.

In order to benefit fully from the course, it is essential you have some background knowledge on electricity and magnetism, basic circuit theory and analysis (**pre-requisite courses: ECE 216 & ECE 250**), and complex number mathematics.

Lecture

A-Section(s): A01 / CRN 10989

Days: Asynchronous

Platform: Brightspace

Laboratory

Asynchronous - details will be posted in Brightspace

Tutorial

T-Section(s): T01 / CRN 11002

Day: Mondays (synchronous)

Time: 4:00 to 4:50 PM (PDT until Nov.1, PST afterwards)

Platform: Zoom – link will be posted in Brightspace

T-Section(s): T02 / CRN 11003

Day: Fridays (synchronous)

Time: 10:30 to 11:20 AM (PDT until Nov. 1, PST afterwards)

Platform: Zoom – link will be posted in Brightspace

Required Textbook

Title: Electrical Engineering – Principles and Applications

Author: Allan R Hambley

Publisher: Pearson

Year: 7th Edition

Online Course Delivery:

As this course will be conducted online during this term, students will need to complete labs online. The students will require access to the following software:

- TinkerCAD (www.tinkercad.com)
- MATLAB including SimScape toolbox (<https://matlab.engr.uvic.ca/> or <https://labs.engr.uvic.ca/>)

Assessment:

Assignments 4 x 5 = 20%

Due Dates: September 25, October 16, November 6 and November 27

Labs 4 x 5 = 20%

Due Dates: September 28, October 19, November 9 and November 30

Exams 4 x 15 = 60%

Date: October 2, October 23, November 13, and December 4

Important: All deadlines and schedules for this course will reference Pacific Daylight Time until November 1, 2020, and then Pacific Standard 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/calendar/archives/202009/undergrad/index.php#/policy/S1AAgoGuV?bc=true&bcCurrent=14%20-%20Grading&bcGroup=Undergraduate%20Academic%20Regulations&bcItem=policies>

There will be no supplemental examination for this course.

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:

- Sep 22, 2020: Withdrawal with 100% reduction of tuition fees
- Oct 13, 2020: Withdrawal with 50% reduction of tuition fees
- Oct 31, 2020: Last day for withdrawal (no fees returned)

Accommodation of Religious Observance:

<https://www.uvic.ca/calendar/archives/202009/undergrad/index.php#/policy/r1q0gofdN?bc=true&bcCurrent=10%20-%20Accommodation%20of%20Religious%20Observance&bcGroup=Undergraduate%20Academic%20Regulations&bcItem=polices>

Policy on Inclusivity and Diversity:

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

Academic Calendar:

<https://www.uvic.ca/calendar/archives/202009/undergrad/index.php#/policy/HkQ0pzdAN?bc=true&bcCurrent=%20General%20University%20Policies&bcGroup=General%20University%20Policies&bcItem=polices>

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/202009/undergrad/index.php#/policy/Sk_0xsM_V?bc=true&bcCurrent=08%20-%20Policy%20on%20Academic%20Integrity&bcGroup=Undergraduate%20Academic%20Regulations&bcItem=polices

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](https://uvicombudsperson.ca/) 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, Website: <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. Written feedback is welcome anytime during the term.