

## COURSE OUTLINE

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### ECE 340 – Applied Electromagnetics and Photonics

Term –**SPRING 2021** (202101)

**Instructor**

Dr. Tao Lu  
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E-mail: [taolu@uvic.ca](mailto:taolu@uvic.ca)

**Office Hours**

Days: Monday  
Time: 6:00pm-10:00pm  
[Location/Platform/link:](#)

Check BrightSpace on zoom meeting address: <https://bright.uvic.ca/d2l/home/52402>

**Course Objectives**

-Study electromagnetic and photonic theory as well as their applications in engineering.

**Learning Outcomes**

- a. Describe mathematically the electric and magnetic fields of TEM waves.
- b. Relate the propagation parameters of a wave to the constitutive parameters of the medium.
- c. Describe wave propagation in a rectangular waveguide.
- d. State the resonant modes inside a rectangular cavity.
- e. State the basic operation of photonic structures.
- f. State the electric and magnetic fields of waves radiated by a dipole antenna.
- g. State the Doppler frequency shift observed by a radar.
- h. Identify the basic operation of satellite communication systems.
- i. Evaluate the rate of power carried by an EM wave in both lossless and lossy media.
- j. Design electromagnetic structures for polarization of electromagnetic waves.
- k. Design electromagnetic structures to optimize transmission behavior of plane-waves incident upon planar boundaries, for both normal and oblique incidences.

**Syllabus**

-Field concept, Maxwell's equations, power, and energy. Plane wave propagation, polarization, and reflection and transmission at material interfaces. Introduction to waveguides, antennas, and photonic structures. Engineering electromagnetics design concepts and examples with emphasis on impedance transformers and shielding structures.

**A-Section(s):** A01 / CRN 20895

**B-Sections(s):** Refer to lecture notes on details.

Days: Monday/Thursday

Time: 11:30-12:50

[Location/Platform/link:](#) Check BrightSpace on zoom meeting address: <https://bright.uvic.ca/d2l/home/52402>

**Required Textbook**

Title: Fundamentals of Applied Electromagnetics, 7ed, ISBN-10:0-13-335681-7  
Author: Fawwaz T. Ulaby and Umberto Ravaioli  
Publisher: Pearson/Prentice hall  
Year: 2015

**Online Course Delivery:**

As this course will be conducted online during this term, students will need to complete assignments/labs online. The students will require access to a computer which has the following software installed: MEFiSTO

**Assessment:**

Assignments:	10%	Due Dates: See brightspace for details
Labs	20%	
Mid-term	20%	Date: Thursday February 24, 2021.
Final Exam	50%	

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

**Note:**

Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.  
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://www.uvic.ca/calendar/archives/202101/undergrad/index.php#/policy/S1AAgoGuV?bc=true&bcCurrent=14%20-%20Grading&bcGroup=Undergraduate%20Academic%20Regulations&bcltemType=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 (Under Review):**

- January 19, 2021: Withdrawal with 100% reduction of tuition fees
- February 9, 2021: Withdrawal with 50% reduction of tuition fees
- February 28, 2021: Last day for withdrawal (no fees returned)

**Accommodation of Religious Observance:**

<https://www.uvic.ca/calendar/archives/202101/undergrad/index.php#/policy/r1q0gofdN?bc=true&bcCurrent=10%20-%20Accommodation%20of%20Religious%20Observance&bcltemType=policies>

**Policy on Inclusivity and Diversity:**

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

Academic Calendar:

<https://www.uvic.ca/calendar/archives/202101/undergrad/index.php#/policy/HkQ0pzdAN?bc=true&bcCurrent=%20General%20University%20Policies&bcGroup=General%20University%20Policies&bcltemType=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/202101/undergrad/index.php#/policy/Sk\\_0xsM\\_V?bc=true&bcCurrent=08%20-%20Policy%20on%20Academic%20Integrity&bcltemType=policies](https://www.uvic.ca/calendar/archives/202101/undergrad/index.php#/policy/Sk_0xsM_V?bc=true&bcCurrent=08%20-%20Policy%20on%20Academic%20Integrity&bcltemType=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 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](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](http://www.uvic.ca/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), Website: <https://uvicombudsperson.ca/>