

## COURSE OUTLINE

---

### **ECE525- Advanced Photonics** **Term – SPRING 2021 (202101)**

**Instructor**

Dr. Reuven Gordon  
Phone: 250-472-5179  
E-mail: [rgordon@uvic.ca](mailto:rgordon@uvic.ca)

**Office Hours by appointment, class hours:**

Days: TWF  
Time: 10:30-11:20

**Location/Platform/link:**

<https://uvic.zoom.us/j/82802570808?pwd=K1FFQ3U3a3p3R3JWQm84QnZsUnQ4dz09>  
<https://bright.uvic.ca/d2l/home/92319>

**Course Objectives**

- The objective of this course is to teach research-level methods in photonics

**Learning Outcomes**

- An expanded analytic capability and improved scientific communication.

**Syllabus**

- Transfer matrix method for multilayer structures, effective index method, coupled mode theory (including gain/losses), perturbation theory, mode-matching, and quasi-static methods. Green's function methods in Quantum Optics (time permitting). The course will also introduce some numerical methods for validation of the analytic methods.

A-Section(s): A01 / CRN 23728

**Text**

Title: Nano and Quantum Optics  
Author: Ulrich Hohenester  
Publisher: Springer  
Year: 2020

<https://link.springer.com/book/10.1007/978-3-030-30504-8> (free to download for UVic students)

**Online Course Delivery (if applicable):**

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: Lumerical (license will be provided), Adobe PDF scanner or camscanner or similar.

**References:**

H. Kogelnik, "Ch. 2: Theory of Dielectric Waveguides," in Integrated Optics, Ed. T.A. Tamir, Springer Verlag, 1979.  
(<http://link.springer.com/content/pdf/10.1007/BFb0103618.pdf> )  
C. Yeh, F. I. Shimabukuro, "The Essence of Dielectric Waveguides," Springer, 2008.  
(<http://link.springer.com/content/pdf/10.1007%2F978-0-387-49799-0.pdf>).

**Assessment:**

Assignments:	40%
Mid-term	20%
Project:	30%
Presentation:	10%

**Important: All deadlines and schedules for this course will reference Pacific Standard Time until March 14, 2021 and then Pacific Daylight Time.**

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 Graduate Calendar.

<https://www.uvic.ca/calendar/archives/202101/grad/index.php#/policy/B13jeiMdE?bc=true&bcCurrent=07%20-%20Grading&bcltemType=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 Secretary 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/grad/index.php#/policy/SkmigiMOV?bc=true&bcCurrent=17%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/grad/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.

<http://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 Graduate Calendar for the UVic policy on academic integrity.

[https://www.uvic.ca/calendar/archives/202101/grad/index.php#/policy/BJujesM\\_E?bc=true&bcCurrent=02%20-%20Policy%20on%20Academic%20Integrity&bcltemType=policies](https://www.uvic.ca/calendar/archives/202101/grad/index.php#/policy/BJujesM_E?bc=true&bcCurrent=02%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 for 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, and 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](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](mailto:ombuddy@uvic.ca), Website: <https://uvicombudsperson.ca/>