

COURSE OUTLINE

ECE 427 Photovoltaics Spring 2021 (202101)

Instructor

Dr. Chris Papadopoulos
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Office Hours

Day: Tuesday Time: 2:30PM – 5:00PM
(or by appointment)
Location: Zoom

Lectures

Sections: A01/CRN 20908
Days: TWF
Time: 11:30AM – 12:20PM
Location: Brightspace

Website

<https://bright.uvic.ca/> (NetLink ID required)

Required Text

Readings will be provided.

Reference texts

Photovoltaic Solar Energy Generation, Lotsch *et al.*, Springer
(e-book available via library).

Physics of Semiconductor Devices, Sze and Ng, Wiley
(standard reference on devices).

Solar Energy, Isabella *et al.*, UIT Cambridge (Kindle edition
available via Amazon).

Topics

- I Review of Electronic Materials and Devices
- II Operating Principles of Solar Cells
- III Conventional Solar Cells
- IV Emerging Photovoltaic Technologies
- V Photovoltaic Systems

Assessment

Tests	15; 20% (Take home, due Mar. 2; Mar. 23)
Term Paper	40% (Due April 12)
Final Exam	25%

Submit all work via Brightspace by 5 PM. Term papers will not be accepted after the due date.

All times local (Victoria, BC).

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&bcItemType=policies>

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar:

https://www.uvic.ca/calendar/archives/202101/undergrad/index.php#/policy/SJ2RxoZ_N?bc=true&bcCurrent=13%20-%20Examinations&bcGroup=Undergraduate%20Academic%20Regulations&bcItemType=policies

Course Withdrawal Deadlines

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

Course Objectives and Learning Outcomes

Understand and apply principles of operation and design of modern photovoltaic device technology: (i) Equations describing device operation; (ii) Appropriate models; (iii) Factors that determine performance.

Syllabus

Photovoltaic materials and device technology. Operating principles of solar cells: Charge excitation, separation and collection. Standard and emerging photovoltaic technologies. Conversion efficiencies, loss mechanisms, systems and manufacturing costs. Photovoltaic technology in the context of worldwide energy demand.

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&bcItemType=policies>

Policy on Inclusivity and Diversity

Engineering: <http://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&bcItemType=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>

Students who have issues with the conduct of the course should discuss them with the instructor. If this does not resolve the issue, students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

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&bcItemType=policies

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/>

Sexualized Violence Prevention and Response at UVic:

UVic takes sexualized violence seriously and 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: Sexualized violence resource office in EQHR; Sedgewick C119; 250.721.8021; svpcordinator@uvic.ca; www.uvic.ca/svp

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 Resource Centre for Students with a Disability 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, which could in some cases constitute a breach of academic integrity as defined in the UVic Calendar.