

## COURSE OUTLINE

### **ECE 427 Photovoltaics Spring 2020 (202001)**

#### **Instructor**

Dr. Chris Papadopoulos  
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E-mail: papadop@ece.uvic.ca

#### **Office Hours**

Day: Tuesday      Time: 2:30PM – 5:00PM  
(or by appointment)  
Location: EOW 429

#### **Lectures**

Sections: A01/CRN 23999  
Days: TWF  
Time: 9:30AM – 10:20AM  
Location: ECS 130

#### **Website**

<http://coursespaces.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 Feb. 25; Mar. 17)
Term Paper	40% (Due April 3)
Final Exam	25%

Submit all work directly to instructor (in-class or office by 5 PM). Term papers will not be accepted after the due date.

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:  
<http://web.uvic.ca/calendar2020-01/undergrad/info/regulations/grading.html>

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:  
<http://web.uvic.ca/calendar2020-01/undergrad/info/regulations/exams.html>

### **Course Withdrawal Deadlines**

- January 19: Withdrawal with 100% reduction of tuition fees
- February 9: Withdrawal with 50% reduction of tuition fees
- February 29: 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**

<http://web.uvic.ca/calendar2020-01/undergrad/info/regulations/religious-observanc.html>

### **Policy on Inclusivity and Diversity**

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

### **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:  
<http://web.uvic.ca/calendar2020-01/undergrad/info/regulations/academic-integrity.html>

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](mailto: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](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:

Sexualized violence resource office in EQHR; Sedgewick C119; 250.721.8021; [svpcoordinator@uvic.ca](mailto:svpcoordinator@uvic.ca); [www.uvic.ca/svp](http://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.