

# COURSE SYLLABUS



COURSE TITLE: PHYS-272: Energy and Sustainability

CLASS SECTION: X01A/B

TERM: F2021

COURSE CREDITS: 4

DELIVERY METHOD(S): Lecture

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

Learn more about Camosun's [Territorial Acknowledgement](#).

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For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>.

*Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.*

## INSTRUCTOR DETAILS

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NAME: Dr. Julie Alexander

EMAIL: [jalex@camosun.bc.ca](mailto:jalex@camosun.bc.ca)

OFFICE: Tech 220

HOURS: M: 3:00 PM – 4:00 PM (In person), T: 12:30 PM – 1:20 PM and 3:30PM – 4:30PM (In person),  
Th: 11:30 AM – 12:20 PM (In person), F: 12:30 PM – 1:00 PM and 2:00PM – 2:30PM (In person)

## CALENDAR DESCRIPTION

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This course examines alternative energy and sustainability of fuel cells, solar, wind and wave power as well as energy storage systems. Students will study waves and sound, electricity and magnetism, radiative heat transfer, semiconductor theory, and nuclear energy.

### PREREQUISITE(S):

One of:

- C in Physics 12
- C in Camosun Alternative

And one of:

- C in MATH 168
- C in MATH 193
- C in MATH 226

### CO-REQUISITE(S):

Not Applicable

### EXCLUSION(S):

Not Applicable

## COURSE LEARNING OUTCOMES / OBJECTIVES

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Upon completion of this course a student will be able to:

1. Solve technical problems requiring the application of particle vibration and wave physics in elastic media, including sound waves, with attention to attenuation.
2. Solve problems involving electric fields for discrete charges and continuous charge distributions.
3. Describe the effects of magnetic fields, and perform calculations involving Faradays Law and Induction.
4. Use fundamental thermal physics, including thermometry conversions, to perform calculations involving radiative heat transfer.
5. Define and describe basic semiconductor theory with emphasis on photovoltaics.
6. Solve technical problems involving properties of the nucleus, radioactivity and nuclear energy.
7. Evaluate sustainability of alternative energy sources including wave, wind, solar and fuel cells.
8. Describe characteristics of alternative energy storage systems.
9. Observe record, organize and display data in tables, graphs or charts.
10. Observe and record sources of error and estimate/compute uncertainty in results.
11. Interpret meaning of experimental results in the context of the experimental objectives.
12. Write scientific reports in an acceptable, traditional format.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

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### Scientific Calculator

Text: Renewable Energy Resources, 3<sup>rd</sup> ed. John Twidell and Tony Weir (available in the bookstore)

Physics 272 Lab Manual (available in the bookstore)

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Physics 272 Energy and Sustainability				
Instructor: Dr. Julie Alexander				F2021
		Text:	Renewable energy Resources, 3rd ed, John Twidell and Tony Weir	
Week	Date		Topics	
1	08-Sep	Wed	Introduction and group selection	
		Thurs	Physics Review	
		Fri	Physics Review	
2	13-Sep	Mon	Tutorial Assignment 1 (Physics Review)	
		Wed	Climate Change Lecture	
		Thurs	Economics of renewable energy	
		Fri	Solar Energy (Chapter 2)	
3	20-Sep	Mon	Tutorial Assignment 2 (Energy and Power)	
		Wed	Solar Energy (Chapter 2)	
		Thurs	Solar Energy (Chapter 2)	
		Fri	Solar Energy (Chapter 2)	
4	27-Sep	Mon	Solar Energy (finish Ch 2 and review variables)	
		Wed	Tutorial Assignment 3 (Solar Energy)	
		Thurs	Holiday	
		Fri	<b>Midterm Test #1 Oct 1</b>	
5	04-Oct	Mon	Review 3 Thermal heat transfer	
		Wed	Review 3 Thermal heat transfer	
		Thurs	Review 3 Thermal heat transfer	
		Fri	Solar Hot Water (Chapter 3)	
6	11-Oct	Mon	Holiday	
		Wed	Solar Hot Water (Chapter 3)	
		Thurs	Solar PV (Chapter 5)	
		Fri	Solar PV (Chapter 5)	
7	18-Oct	Mon	Tutorial Assignment 4 (Solar Water Heating)	

		Wed	Solar PV (Chapter 5)	
		Thurs	Solar PV (Chapter 5)	
		Fri	Solar PV (Chapter 5)	
8	25-Oct	Mon	Tutorial Assignment 5 (Photovoltaics)	
		Wed	Hydropower (Chapter 6)	
		Thurs	Hydropower (Chapter 6)	
		Fri	Hydropower (Chapter 6)	
9	01-Nov	Mon	Tutorial Assignment 6 (Hydropower)	
		Wed	Wind Resource (Chapter 7)	
		Thurs	Wind Resource (Chapter 7)	
		Fri	Wind Power (Chapter 8)	
10	08-Nov	Mon	Tutorial Assignment 7 (Wind Resource)	
		Wed	<b>Midterm Test #2 on solar thermal, PV and hydro</b>	
		Thurs	Holiday	
		Fri	Wind Power (Chapter 8)	
11	15-Nov	Mon	Wind Power (Chapter 8)	
		Wed	Wind Power (Chapter 8)	
		Thurs	Biomass (Chapter 9 )	
		Fri	Wave Energy (Chapter 11)	
12	22-Nov	Mon	Tutorial Assignment 8 (Wind Power)	
		Wed	Tidal Energy (Chapter 12)	
		Thurs	Geothermal Energy (Chapter 14)	
		Fri	Geothermal Energy (Chapter 14)	
13	29-Nov	Mon	Tutorial Assignments 9 (Biomass) & 10 (Ocean power)	
		Wed	Geothermal Energy (Chapter 14)	
		Thurs	Last Lecture	
		Fri	Tutorial Assignment 11 (Geothermal Energy)	
14	06-Dec	Mon	Review	
		Wed	Student presentations	
		Thurs	Student presentations	
		Fri	Student presentations	

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

## EVALUATION OF LEARNING

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DESCRIPTION	WEIGHTING
Assignments	10%
Student Presentation	10%
Labs	15%
Two Midterm tests	25%
Final Exam	40%
<b>TOTAL</b>	<b>100%</b>

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the [Grade Review and Appeals](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

## COURSE GUIDELINES & EXPECTATIONS

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Assignments will be done in class during the tutorial periods. The midterm tests are Friday Oct. 1 and Wednesday Oct 10. The final exam will be three hours during the exam period.

Students will be required to participate in a group presentation during the last week of classes. Details are on D2L.

## SCHOOL OR DEPARTMENTAL INFORMATION

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### PHYSICS DEPARTMENT GUIDELINES REGARDING TESTING AND GRADING:

- The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar, “students are expected to write tests and final exams at the scheduled time and place.” Exceptions will only be considered due to emergency circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.
- Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. Missed exams normally receive a zero grade. Instructors are not required to provide make-up

tests. At their discretion, instructors may waive a test in exceptional circumstances such as medical issues or a documented illness.

- Any outstanding homework or labs must be submitted prior to the last day of classes, and will be graded according to the late policy outlined by the instructor.
- Refer to your instructor’s information page for any additional policies regarding testing and grade calculation.

PHYSICS DEPARTMENT GUIDELINES REGARDING LABS:

- Students must obtain an overall grade of 50% or higher in the laboratory component of the course order to obtain credit for the course.
- Attendance is mandatory & you may be required to “sign in” at the beginning of each lab period. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances. If you will be absent from a lab period due to illness it is your responsibility to notify your instructor.
- At the discretion of the instructor, a student who is repeating this Physics course with a laboratory grade of 70% or higher may apply for lab exemption.

STUDENT RESPONSIBILITY

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Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

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Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit <http://camosun.ca/students/>.

Academic Advising	<a href="http://camosun.ca/advising">http://camosun.ca/advising</a>
Accessible Learning	<a href="http://camosun.ca/accessible-learning">http://camosun.ca/accessible-learning</a>
Counselling	<a href="http://camosun.ca/counselling">http://camosun.ca/counselling</a>
Career Services	<a href="http://camosun.ca/coop">http://camosun.ca/coop</a>
Financial Aid and Awards	<a href="http://camosun.ca/financialaid">http://camosun.ca/financialaid</a>
Help Centres (Math/English/Science)	<a href="http://camosun.ca/help-centres">http://camosun.ca/help-centres</a>
Indigenous Student Support	<a href="http://camosun.ca/indigenous">http://camosun.ca/indigenous</a>
International Student Support	<a href="http://camosun.ca/international/">http://camosun.ca/international/</a>

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Learning Skills	<a href="http://camosun.ca/learningskills">http://camosun.ca/learningskills</a>
Library	<a href="http://camosun.ca/services/library/">http://camosun.ca/services/library/</a>
Office of Student Support	<a href="http://camosun.ca/oss">http://camosun.ca/oss</a>
Ombudsperson	<a href="http://camosun.ca/ombuds">http://camosun.ca/ombuds</a>
Registration	<a href="http://camosun.ca/registration">http://camosun.ca/registration</a>
Technology Support	<a href="http://camosun.ca/its">http://camosun.ca/its</a>
Writing Centre	<a href="http://camosun.ca/writing-centre">http://camosun.ca/writing-centre</a>

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If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

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## COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

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### Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](#) (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started:

<http://camosun.ca/services/accessible-learning/>

### Academic Integrity

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf> for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

### Academic Progress

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf> for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

### Course Withdrawals Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <http://camosun.ca/learn/fees/#deadlines>.

### Grading Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf> for further details about grading.

### Grade Review and Appeals

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

### Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the “Attendance” section under “Registration Policies and Procedures” (<http://camosun.ca/learn/calendar/current/procedures.html>) and the Grading Policy at <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>.

### Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf> to learn more about the process involved in a medical/compassionate withdrawal.

### Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun’s Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student’s right to choose what is right for them. For more information see Camosun’s Sexualized Violence and Misconduct Policy: <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf> and [camosun.ca/sexual-violence](http://camosun.ca/sexual-violence). To contact the Office of Student Support: [oss@camosun.ca](mailto:oss@camosun.ca) or by phone: 250-370-3046 or 250-3703841

### Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College’s Student Misconduct Policy at <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf> to understand the College’s expectations of academic integrity and student behavioural conduct.

**Changes to this syllabus:** Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.