

COURSE SYLLABUS



COURSE TITLE: PHYS-295: Physics (Engineering Bridge)

CLASS SECTION: X01 A/B and X02 A/B

TERM: 2022W

COURSE CREDITS: 3

DELIVERY METHOD(S): Face to Face Lectures and Labs

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

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

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

NAME: ED NELSON

EMAIL: nelson@camosun.bc.ca

OFFICE: TECH 218

HOURS: M 2:30 – 3:30; TWTh 3:30 – 4:30

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

Topics will be reviewed and expanded beyond those covered in technology programs including thermal energy, mechanical waves, sound, physical optics, geometric optics, elementary electricity and magnetism, simple AC and DC circuits.

PREREQUISITE(S):

Restricted to students in Engineering Bridge

CO-REQUISITE(S):

Not Applicable

EXCLUSION(S):

Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course students will be able to:

1. Describe the operation of several temperature sensors including the function and temperature calculations for a constant volume gas thermometer.
2. Solve problems involving thermal expansion in one and three dimensions. and derive from first principles the expressions required to solve these problems.
3. Solve problems involving the transfer of thermal energy with regard to specific heat capacity, latent heat and change of phase.
4. Solve problems involving the displacement wave function for transverse and longitudinal waves in elastic media with attention to wave number angular frequency, phase constant, and wave and particle velocities.
5. Derive the pressure wave function for sound waves and solve related problems.
6. Derive from first principles, the wave equation, the solution, and the expression for the wave velocity.
7. Derive the expressions for the interference of two or more waves including the phenomena of beats and standing waves.
8. Derive the expressions for, and solve problem involving the Doppler Effect.
9. Derive the expressions for, and solve problems involving physical optics phenomena including: double and multiple slit interference, thin films, diffraction and resolution of images.
10. Solve problems in geometrical optics including lenses, mirrors, prisms, and total internal reflection.
11. Use Coulomb's Law to solve problems in electrostatics for two or more charges.
12. Solve problems involving electric fields, electric potential, and potential difference for discrete charges and continuous charge distributions.
13. Analyze series and parallel electric circuits.
14. Solve problems involving magnetic flux density and magnetic forces on charges including forces on current carrying wires and torques on current loops.
15. Assemble experimental apparatus using written instructions.
16. Observe, record, organize and display data in tables, graphs or charts.
17. Analyze linear graphs (determine area, slope, intercept, etc.).
18. Observe and record sources of error and estimate the range of uncertainty in results.
19. Interpret meaning of experimental results in the context of the experimental objectives.
20. Write scientific reports in an acceptable, traditional format.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

University Physics (Pearson) Young and Freedman, 14e or 15e

PHYS 295 Lab Manual

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.

Please see the PHYS 295 Timeline at the end of this document for your particular section.

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 noticed is required. Deadlines scan 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

DESCRIPTION	WEIGHTING
HOMEWORK (assigned weekly)	20
MIDTERMS (3) "Celebration of Knowledge" Lowest mark dropped	30
LAB REPORTS (mandatory)	25
FINAL CELEBRATION of KNOWLEDGE (date TBA)	25
	TOTAL
	100%

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 policy for more information.

<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

COURSE GUIDELINES & EXPECTATIONS

- Course content, announcements, and important class information will be posted on D2L. Students must check D2L regularly.
- Homework will be assigned every week and will be submitted to D2L folders.
- Three (3) midterm tests will occur at the dates and times listed below. Out of the three midterm tests, the lowest midterm grade will be dropped for each student to make up the 30% weighting.
- The lab reports will be submitted to D2L folders. Lab reports are due ONE WEEK after the date of the lab exercise. Attendance and submission of Lab reports is mandatory and required to obtain credit in the course.

SCHOOL OR DEPARTMENTAL INFORMATION

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 and 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.
- Unless otherwise stated by your instructor late penalties are as follows: For overdue labs (or assignments), a late penalty of 1 mark per day (10%) will be assessed for the first five days following the due date. After this date a complete report is still required and earns a maximum mark of 50%.
- 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.
- Students will complete a minimum of 9 laboratory experiments including 3 formal reports (with full uncertainty calculations) and at least one lab using technology to perform data analysis.

STUDENT RESPONSIBILITY

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

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	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

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.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

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](http://camosun.ca/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. To contact the Office of Student Support: 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.

Continued ...

**PHYSICS 295 DX01AB
TIMELINE 2022 W**

CK = Celebration of Knowledge (test)

<i>Week</i>	<i>Laboratory B MONDAY (10:30)</i>	<i>Laboratory A TUESDAY (1:30)</i>	<i>Lecture 1 Wednesday (9:30)</i>	<i>Lecture 2 Thursday (11:30)</i>	<i>Lecture 3 Friday (10:30)</i>
1 Jan 10 – 14	Excel Graphing Exercise	Excel Graphing Exercise	Introduction	Temp Scales Cons Vol Gas Thermometer	Linear Expansion
2 Jan 17- 21	Linear Expansion (Hand Out)*	Linear Expansion (Hand Out)*	Linear/Volumetri c Expansion	Specific Heat	Latent Heat Calorimetry
3 Jan 24- 28	Lab 9 Electric Energy and Specific Heat	Lab 9 Electric Energy and Specific Heat	Calorimetry Phase Diagrams	Waves 1 Wave Equation	Waves 2
4 Jan 31- Feb 4	CK #1	CK #1	Waves 3 Beats and Doppler Effect	Waves 4 Beats and Doppler Effect	Optical Interference 1 Double Slit
5 Feb 7-11	Lab 8 Standing Waves*	Lab 8 Standing Waves*	Optical Interference 2 Double/Multiple	Optical Interference 3 Thin Film/Diff	Geometric Optics Reflection Refraction
6 Feb 14- 18	Lab 4 Image Formation in Thin Lens	Lab 4 Image Formation in Thin Lens	Image Formation in Mirrors 1	Image Formation in Lenses 2	Charges Coulomb's Law 1
7 Feb 21- 25	FAMILY DAY (College Closed)	READING BREAK (College Closed)	READING BREAK (College Closed)	READING BREAK (College Closed)	READING BREAK (College Closed)
8 Feb 28 – Mar 4	Electric Field Mapping (Hand out)	Electric Field Mapping (Hand out)	Charges Coulomb's Law 2	Charges Coulomb's Law 3 Distributions	Electric Field 1 Point Charges
9 Mar 7- 11	CK #2	CK #2	Electric Field 2 Distributions	Electric Potential Energy Electric Potential	Electric Currents 1 Resistivity
10 Mar 14- 18	Lab 5 Resistivity of Ni Chrome Wire*	Lab 5 Resistivity of Ni Chrome Wire*	Electric Currents 2 Resistivity Ohm's Law	Electric Currents 3 Ohm's Law Electric Power	Resistors in Series and Parallel
11 Mar 21- 25	Lab 6 Kirchoff's Rules with Uncertainty	Lab 6 Kirchoff's Rules with Uncertainty	Resistors in Series and Parallel	Kirchoff's Laws 1	Kirchoff's Laws 2
12 Mar 28- Apr 1	Magnetic Force on a Wire (Hand out)	Magnetic Force on a Wire (Hand out)	Series/Parallel Combination	Magnetism Introduction	Sources of Magnetic Fields
13 Apr 4-8	CK #3	CK #3	Magnetic Forces on Currents	Magnetic Forces on Currents	Magnetic Induction
14 Apr 11- 15	REVIEW	REVIEW	Lecture Time Not assigned	Lecture Time Not assigned	REVIEW (last day)

**PHYSICS 295 DX02AB
TIMELINE 2022 W**

CK = Celebration of Knowledge (test)

<i>Week</i>	<i>Lecture 1 Monday (8:30)</i>	<i>Laboratory A Wednesday (1:30)</i>	<i>Lecture 2 Thursday (8:30)</i>	<i>Lecture 3 Friday (9:30)</i>
1 Jan 10 – 14	Introduction	Excel Graphing Exercise	Temp Scales Cons Vol Gas Thermometer	Linear Expansion
2 Jan 17- 21	Linear/Volumetri c Expansion	Linear Expansion (Hand Out)*	Specific Heat	Latent Heat Calorimetry
3 Jan 24-28	Calorimetry Phase Diagrams	Lab 9 Electric Energy and Specific Heat	Waves 1 Wave Equation	Waves 2
4 Jan 31- Feb 4	Waves 3 Beats and Doppler Effect	CK #1	Waves 4 Beats and Doppler Effect	Optical Interference 1 Double Slit
5 Feb 7-11	Optical Interference 2 Double/Multiple	Lab 8 Standing Waves*	Optical Interference 3 Thin Film/Diff	Geometric Optics Reflection Refraction
6 Feb 14-18	Image Formation in Mirrors 1	Lab 4 Image Formation in Thin Lens	Image Formation in Lenses 2	Charges Coulomb's Law 1
7 Feb 21-25	FAMILY DAY (College Closed)	READING BREAK (College Closed)	READING BREAK (College Closed)	READING BREAK (College Closed)
8 Feb 28 – Mar 4	Charges Coulomb's Law 2	Electric Field Mapping (Hand out)	Charges Coulomb's Law 3 Distributions	Electric Field 1 Point Charges
9 Mar 7-11	Electric Field 2 Distributions	CK #2	Electric Potential Energy Electric Potential	Electric Currents 1 Resistivity
10 Mar 14- 18	Electric Currents 2 Resistivity Ohm's Law	Lab 5 Resistivity of Ni Chrome Wire*	Electric Currents 3 Ohm's Law Electric Power	Resistors in Series and Parallel
11 Mar 21- 25	Resistors in Series and Parallel	Lab 6 Kirchoff's Rules with Uncertainty	Kirchoff's Laws 1	Kirchoff's Laws 2
12 Mar 28- Apr 1	Series/Parallel Combination	Magnetic Force on a Wire (Hand out)	Magnetism Introduction	Sources of Magnetic Fields
13 Apr 4-8	Magnetic Forces on Currents	CK #3	Magnetic Forces on Currents	Magnetic Induction
14 Apr 11-15	Lecture Time Not assigned	REVIEW	Lecture Time Not assigned	REVIEW (last day)

