



CAMOSUN COLLEGE
School
Department

ECET 214 Electrical Properties of Materials
Fall 2019

COURSE OUTLINE

A continuation of the description of electrical properties of materials in PHYS 154 and PHYS 155.
Topics: Materials for engineering, atomic bonds, crystal structure, metals, semiconductors, insulators, electronic conduction in solids, and environmental degradation of materials.

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

- (a) **Instructor** Godfried Pimlott _____
- (b) **Office hours** _____
- (c) **Location** TEC 209 _____
- (d) **Phone** 250-370-4430 **Alternative:** _____
- (e) **E-mail** pimlott@camosun.bc.ca _____
- (f) **Website** _____

2. Intended Learning Outcomes

(If any changes are made to this part, then the Approved Course Description must also be changed and sent through the approval process.)

3. Required Materials

- (a) Texts N/A

- (b) Other N/A

4. Course Content and Schedule

(Can include: Class hours, Lab hours, Out of Class Requirements and/or Dates for quizzes, exams, lecture, labs, seminars, practicums, etc.)

1. Structure and properties - Introduction

Types of materials -

Periodic table, Metals and alloys, Ceramics and glasses, Polymers, Composites,
Semiconductors

2. The Quantum Atom

3. Atomic Structure

Atoms and the periodic table

Primary and secondary bonds

The ionic bond - Coordination numbers

The covalent bond

The metallic bond

The Van der Waals bond

4. Crystal structure

Systems and lattices

Lattice structure

Metals, Ceramics, Polymers, Semiconductors

X-ray diffraction

5. Imperfections in solids

Solid solutions

Point defects - Solid state diffusion

Linear defects

Planar defects

Noncrystalline solids

The electron microscope

6. Conduction in solids

Conductivity - Charge carriers

Drift velocity, Mobility

Energy bands

Fermi function

Conductors

Effect of temperature on resistivity

Insulators

Semiconductors

Intrinsic semiconductors

Extrinsic Semiconductors

Electrical properties

Energy gap, Fermi function, effect of temperature, electron mobility, hole mobility, conduction electron density

Compound semiconductors

Amorphous semiconductors

7. Insulators

Electrical properties

Ferroelectrics and Piezoelectrics

Optical properties

Reflection and refraction

Refractive index, Interference, Transparency, Absorption – Colour

5. Basis of Student Assessment (Weighting)

(Should be directly linked to learning outcomes.)

Assignments 30%

Quizzes 10%

Final Exam 60%

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)

(Mark with "X" in box below to show appropriate approved grading system – see last page of this template.)

Standard Grading System (GPA)

Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

8. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at <http://camosun.ca/about/policies/index.html> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.