CAMOSUN COLLEGE	**School of Arts & Science** **CHEMISTRY AND GEOSCIENCE DEPARTMENT** **CHEM 251** **Immunology** **Fall Semester, 2016**

COURSE OUTLINE

The course description is online @ http://camosun.ca/learn/calendar/current/web/chem.html

Ω *Please note: the College electronically stores this outline for five (5) years only.*
*It is **strongly recommended** you keep a copy of this outline with your academic records.*
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

(a)	Instructor:	Jamie Doran, Ph.D.
(b)	Office Hours:	Monday, 2:00 pm to 3:00 pm Tuesday, 2:00 pm to 3:00 pm Wednesday, 11:00 am to 12:00 pm Thursday, 2:00 pm to 3:00 pm Friday, 12:00 pm to 1:00 pm
(c)	Location:	Room 350C, Fisher Building, Lansdowne Campus
(d)	Phone:	(250) 370-3441
(e)	Email:	jdoran@camosun.ca

2. Intended Learning Outcomes

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

1. Evaluate fundamental aspects of the human immune system, and relate these to a wide variety of immunologically-based clinical conditions including allergies, transplant rejections, autoimmune diseases, and immunodeficiencies including AIDS.
2. Compare and contrast various types of antibody-based diagnostic tests, and various vaccine formulations.
3. Have hands-on experimental skills required to conduct the most commonly used immunological techniques including enzyme-linked immunosorbent assays (ELISA), latex bead agglutination assays, and Western-blotting detection of antigens.
4. Evaluate experimental design, design control experiments, and interpret data arising from basic immunological technologies.
5. Work in a biosafety level-1 laboratory.
6. Prepare, handle and store many types of solutions, buffers, reagents, and equipment used in immunological experimentation.

3. Required Materials

(a) Text

Parham, P. 2015, *The Immune System.* 4th ed. Garland Science, New York.

This textbook can be purchased at the Lansdowne Campus bookstore. Also, a copy of the textbook is available on loan through the Lansdowne Campus reserve library.

(b) Other

Laboratory Manual, and Selected Course Notes and Lecture Slides. 2015 Edition

This required course pack contains the laboratory manual, selected course notes, and selected lecture slides from the textbook. It can be purchased at the Lansdowne Campus bookstore.

General Materials and Supplies

Safety glasses — Safety glasses are required when handling hazardous chemicals, immunochemicals or biochemicals. Each student is required to provide her or his pair of safety glasses. Students lacking safety glasses when they are required will not be permitted to be in the laboratory.

Lab coats — Lab coats are required for all experimental work in the laboratory. Each student is required to provide her or his own lab coat. Students lacking lab coats will not be permitted to be in the laboratory.

Latex gloves — Latex or other 'non-allergenic' gloves *will be available in the lab* and are to be used when appropriate to protect the skin from potentially hazardous chemicals or, much more often, to protect labile biochemicals and immunochemicals from contamination or becoming degraded by enzymes from the skin.

Calculator — A scientific calculator is required at times in the laboratory, in lecture, and during tests and exams. Each student is required to provide her or his own scientific calculator. Cell phone-, tablet-and computer-based calculators cannot be used during term tests or the final exam.

4. Course Content and Schedule

Credits	4 credits
In-class workload	6 hours per week • There are three 50-minute lectures per week. Term test review periods will be scheduled into an appropriate lecture slot prior to each test. • Experiments, pre-lab talks & post-lab analyses are conducted during most of the 2 h & 50 min laboratory periods. This time slot is also used for the two term tests and for a final exam review.
Out-of-class workload	6 hours per week
Number of weeks	14 weeks
Pre-requisite	Chem 120 - College Chemistry 1

Course times and locations

Lectures
Mondays, 8:30 AM to 9:20 AM
Fisher Building, Room F360

Tuesdays, 8:30 AM to 9:20 AM
Fisher Building, Room F360

Fridays, 8:30 AM to 9:20 AM
Fisher Building, Room F360

Laboratory Experiments & Term Test Times*

Fridays, 1:30 PM to 4:20 PM
Fisher Building, Room F360

* *Please see the laboratory and term test schedule below.*

Lecture Outline

HISTORICAL PERSPECTIVE
Reading relevant to this initial lecture material is provided in the 'Selected Course Notes' section of the course pack under the heading 'Historical Perspective on the Field of Immunology' (pages 271 to 277). Much of this information is introduced in The Immune System, 4th ed. *by Peter Parham. However, it is portioned across several of the chapters often appearing in the introductory sections.*

- Early historical evidence of immunity in humans
  - Earliest evidence of the phenomenon of 'immunity'
  - Recognition of the four basic tenants of adaptive immunity
- Variolation & the early evidence of vaccination
- Development of Jenner's small pox vaccine
- Development of the field of immunology

- Louis Pasteur (1860's- 1890's) creates the field of immunology with seminal experiments demonstrating vaccination and acquired immunity in animals and humans.
- Pasteur and Koch compete to create widely-accepted vaccines.
- Metchnikoff establishes the field of cellular immunology (1880's)
- Nuttal (1888) & Von Behring (1888-1890's): humoral immunity
- Wright (1903): synergy of cellular and humoral immunity.
- Paul Erlich (early 1900's-1915): furtherance of understanding.
- Border (early 1900's): immune responses to non-pathogenic cells
- Lansteiner (early 1900's): blood group, ABO antigens.
- Ramon (1928): toxoids (attenuated chemicals) as vaccines
- Kabat (1930's): isolated immunoglobulins (antibodies) from blood
- Chase (1940's): demonstrates transfer of cellular immunology
- (*Note the list of Nobel Prize winning immunologists at the end of the selected notes*.)

GENERAL ROLE FOR THE IMMUNE SYSTEM IN MAINTAINING BODY INTEGRITY

Reading Chapter 1, sections 1-1, 1-2, 1-5, 1-6, 1-8 and 1-11 to 1-14

- Challenges to health: infectious organisms, cancer, toxins
- Innate immunity 'versus' adaptive immunity
- The lymphatic system *(will be integrated with discussion of innate immunity, below)*
  - Primary and secondary lymphatic tissues
  - Structure and function of the lymphatic system as it relates to immunity
- Primary immune responses vs. secondary immune responses

THE INNATE IMMUNE RESPONSE

Reading Chapter 1, sections 1-3, 1-4 & 1-7
Chapter 2, sections 2-1 to 2-8 & 2-9 to 2-11
Chapter 3, sections 3-1 to 3-21
Chapter 9, sections 9-17, 9-18 & 9-19 (on complement)
Chapter 10, sections 10-1 to 10-3
Selected Course Notes, 'Innate Immunity', pages 278 to 285.
Selected Course Notes. 'Complement and Activation of the Classical & Alternative Pathways', pages 286 to 293.

Browse Chapter 12, sections 12-1 to 12-9 to collect more salient information on NK cells.

- General characteristics of nonspecific physical and chemical defenses
  - Physical barriers
    - Skin and mucous membranes
  - Defensive chemicals
    - pH, lysozyme, iron-binding compounds, defensins, & others
  - Natural bacterial flora and microbial antagonism
- White blood cells (leukocytes) involved in innate immunity
  - Phagocytic cell types: monocytes & macrophage, neutrophils (PMN's), dendritic cells, Langerhans cells
  - Nonphagocytic leukocytes: eosinophils, natural killer cells
  - Inflammatory leukocytes: mast cells, basophils
  - Lymphocytes: B-cells and T-cells
  - Origins of myeloid and lymphoid cell lines
- The innate, acute, inflammatory response
  - Constriction and local dilation of vessels
  - Roles for cells and soluble factors from the blood
  - Margination, extravasation (diapedesis), chemotaxis
  - Mast cell activity, soluble mediators
- The process of phagocytosis by macrophage
  - Antigen presentation links innate immunity with adaptive immunity
  - Oxygen-dependent and oxygen-independent killing mechanisms
  - Microbial strategies for the prevention of phagocytic killing
- Cytokines, an Introduction.
  - General nature and characteristics
  - Autocrine and paracrine functions
  - Classic characteristics: pleotrophy, redundancy, synergy, antagonism
- Cytokines, other humoral factors, and cell receptors involved in innate immunity
  - Broad picture of cytokine-mediated immunoregulation
  - Chemokines
  - Interferons α and β
  - Toll-like receptors
  - C-reactive protein & other acute phase proteins
  - Adhesion molecules

- Complement
    - Classical complement pathway
    - Alternative complement pathway
    - Lectin-mediated complement activation pathway
    - Roles of products of complement activation and other acute phase proteins in the inflammatory response and other aspects of immunity.
- Natural killer (NK) cells
    - Roles in innate immunity
    - Cytotoxic mechanisms
    - Roles in conjunction with adaptive immunity

GENERAL NATURE OF ANTIBODIES AND ANTIGENS
This information will be introduced early in the course in support of laboratory experiments.

- Basic nature of antibodies
- Antigens, immunogens, and haptens
    - Epitopes (antigenic determinants)
    - Characteristics and properties of immunogens
    - Experimental conditions that affect the immunogenicity of immunogens
    - Vaccination conditions that affect the immunogenicity of immunogens

ANTIBODIES - STRUCTURE & DIVERSITY
Some of this information will be introduced early in the course in support of laboratory experiments.
Reading Chapter 4, sections 4-1 to 4-16
Browse Chapter 4, section 4-17

- Antibodies
    - Structure and function of a prototypic, divalent Ab molecule
        - ◊ Fab and Fc fragments
        - ◊ Globular constant domains
        - ◊ Variable and hypervariable (CDR) regions
    - Isotypes (classes) of antibodies
        - ◊ Classes of heavy and light chains
        - ◊ Immunological characteristics and functions
    - Idiotypes
- Genetics of antibody diversity Antibody production by B-cells
    - Multi-gene organization of immunoglobulin genes
    - Variable region gene rearrangements
    - Generation of antibody diversity
    - Class switching
- Monoclonal Antibodies (MAbs) (material presented in conjunction with MAb labs)
    - Technical means of producing MAbs
    - Roles of MAbs as drugs
    - Roles of MAbs in drug targeting
    - Roles of MAbs in diagnostics

B-CELL ACTIVATION & ANTIBODY EFFECTOR FUNCTIONS
Reading Chapter 6, Introduction, sections 6-1, 6-2, 6-4, 6-5, & 6-9 to 6-16
Chapter 9, sections 9-1, 9-3, 9-4 to 9-6, & 9-8 to 9-16
Chapter 10, sections 10-12 to 10-15
Browse Chapter 9, sections 9-2, 9-7 & 9-21 to 9-24

- Development & processing of B-cells
- Antibody production by B-cells
    - Clonal selection and antibody synthesis
    - B-cell receptors and antigen binding
    - B-cell activation and maturation
        - Plasma cells
        - Memory B-cells
    - Affinity maturation
    - Relationship of affinity maturation to class switching
    - Relationship of affinity maturation to memory B-cells
- Antibody effector functions
    - Roles as adaptor molecule
    - Roles specific to classes (isotypes) of antibodies
- Antibody interactions with Fc receptors on macrophage, mast cells, basophils, eosinophils and natural killer (NK) cells.
    - ADCC (antibody-dependent cell-mediated cytotoxicity)

- B-cell Receptors & cell adhesion molecules
- Role of CD4 Helper T_H2-cells in antibody production
- Role of CD4 Helper T_H2 -cells in CD4 B-cell activation
- T-independent B-cell antigens
- Role of the lymphatic system
- The role of T-helper cell - B-cell interactions
    - Affinity maturation and isotype switching
    - Prevention of harmful effects of affinity maturation

T-CELL ANTIGEN RECOGNITION AND ACTIVATION, AND T-CELL MEDIATED IMMUNITY

Reading Chapter 5, Introduction and sections 5-1, 5-2, 5-4, 5-6 to 5-11 & 5-13 to 5-23
Chapter 7, Introductions and sections 7-1, 7-8 & 7-10 to 7-14
Chapter 8, Introductions and sections 8-1 to 8-3, 8-8 to 8-11, and 8-14 to 20
Chapter 10, sections 10-4 to 10-11 & 10-16
Browse Chapter 5, sections 5-3, 5-5 & 5-12
Chapter 7, sections 7-2, 7-3, 7-5 & 7-9
Chapter 8, sections 8-4, 8-5 (note phase one trial), 8-6, 8-7 & 8-13
Chapter 12 sections 10 to 16
Chapter 13 section 6 (super-antigens)

- Development and processing of T-cells.
- T-cell receptors
    - T-cell receptor diversity
    - Role of $\alpha\beta$ receptors
    - role of $\gamma\delta$ receptors
- MHC Presentation and T-cell Surface Proteins CD4 and CD8
    - Endogenous antigen processing
    - Exogenous antigen processing
    - Role of CD4 in recognition of MHC II
    - Role of CD8 in recognition of MHC I
    - 'T-cell restriction'
    - MHC polymorphism
- CD4 & CD8 T-cell subclasses
    - Cytotoxic T-cells, helper T-cells, regulatory T-cells
    - Clonal selection applies to cytotoxic T-cells
    - MHC I presentation & Tc-cell Activation
    - MHC II presentation & APC-cell Activation
    - Roles of antigen-presenting cells (APC's)
        - Macrophage
        - Dendritic cells
        - Langerhans cells
        - B-cells
- Adhesion molecules: CD molecules, selectins, integrins, toll-like receptors
- Role of CD4 Helper T_H1-cells in CD8 cytotoxic T-cell activation
- Activity of cytotoxic CD8 T-cells
- Role of CD4 Helper T-cells in CD8 cytotoxic macrophage activation
- Role of CD4 Helper T_H2 -cells in CD4 B-cell activation
- T_H1 vs. T_H2 Responses
    - Humoral vs. cellular immune responses
    - Cytokine profiles
    - Polarization (humoral vs. cellular) of immune responses
    - Functions of cytokines in mediating polarization
- Activity of cytotoxic CD8 T-cells

EVASION OF THE IMMUNE SYSTEM BY PATHOGENS

Reading Chapter 11, section 11-13
Chapter 13, sections 13-1 to 13-5

- Microbial means of immune evasion

IMMUNODEFICIENCY

Reading Chapter 13, sections 13-8 to 13-16 & 13-20 to 13-22
Selected Course Notes, 'Primary and Secondary Immunodeficiencies', pages 304 to 308
Read Selectively Chapter 13, sections 13-17 to 13-19, 13-21 & 13-23 to 13-25

- Primary immunodeficiencies
- Secondary immunodeficiencies including AIDS

HYPERSENSITIVITY (Allergy)

Reading Chapter 14, sections 14-1 to 14-6, 14-8 to 14-13
Selected Course Notes, 'The Hygiene Hypothesis', pages 294 to 295
Browse Chapter 14, section 14-7

- The nature of hypersensitivity and allergens
- Types of hypersensitivity
    - Immediate-type hypersensitivity
        - Type 1 - Anaphylactic hypersensitivity
            - ◊ Systemic anaphylaxis
            - ◊ Localized anaphylaxis
        - Type 2 - Antibody-dependent cytotoxicity hypersensitivity
        - Type 3 - Complex-mediated hypersensitivity
            - ◊ Systemic
            - ◊ Localized
    - Delayed type hypersensitivity
        - Type 4 - Cell-mediated hypersensitivity
- Allergy rates and the hygiene hypothesis

IMMUNOTOLERANCE

- Significance of immunotolerance to health
- Mechanisms of immunotolerance
    - Self-tolerance
        - Immunological silence
            - ◊ Central tolerance
            - ◊ Peripheral tolerance
            - ◊ Cross-tolerance
        - Immunological ignorance
    - Functional tolerance

AUTOIMMUNITY

Reading Chapter 16, sections 16-1 to 16-2, 16-15, 16-6, 16-8 to 16-10, 16-12 to 16-14 & 16-16 to 16-18
Selected Course Notes, 'Characteristics of Some Autoimmune Diseases', pages 296 to 303
Browse Chapter 16, sections 16-3, 16-4, 16-7 & 16-11

- Major sources of autoimmunity
- Autoimmune diseases
    - Tissue-specific diseases
        - Aspermatogenesis
        - Sympathetic opthamalia
        - Hashimoto's thyroditis
        - Insulin-dependent diabetes
        - Autoimmune anemias
            - Pernicious anemia
            - Hemolytic anemias
        - Goodpasture's syndrome
        - Graves disease
    - Systemic autoimmune diseases
        - SLE (Lupus)
        - MS
        - Rheumatoid arthritis

TRANSPLANTATION IMMUNOLOGY

Reading selectively Chapter 15, sections 15-1 to 15-14 & 15-18 & 15-23
Browse Chapter 15, sections 15-15 to 15-17 & 15-24 to 15-27

- Autograft, isograft, allograft, xenograft
- Privileged sites & privileged tissues
- Graft rejection
    - Hyperactive rejection
    - Acute rejection
        - First-set rejection
        - Second-set rejection
    - Chronic rejection
- Prevention of rejection
    - Tissue typing
    - Immunosuppressive agents
- Clinical transplantation

- Current status
- Graft vs. host reaction

- Acquired immunotolerance
    - Low-zone tolerance
    - High-zone tolerance
    - Immunotolerance created by certain immunization regimes
    - Natural acquisition of 'immunotolerance' in people
- Blood Group Antigens
    - Rh antigens and fetal hemolytic disease
    - ABO antigens and compatible blood donors

VACCINES
Reading Chapter 11, sections 11-1 to 11-11 & 11-14 to 11-28.
Browse Chapter 11, sections 11-12 & 11-13

- Needs, benefits, and potential risks
- Type of vaccines
    - Killed or otherwise inactivated vaccines
    - Live attenuated vaccines
    - Subunit vaccines
        - Purified biomolecules
        - Recombinant vaccines
        - Peptide vaccines
        - DNA vaccines
        - Heterologous vaccines

CANCER IMMUNOLOGY
Reading Chapter 17, sections 17-1 to 17-11 & 17-17
Browse Chapter 17, sections 17-12 to 17-16

- Tumour-Specific transplantation antigens
    - Viral antigens
    - Chemically-induced tumour antigens
- Tumour-associated transplantation antigens
    - Carcinofetal antigens
    - Embryonic antigens
    - Alpha-feto protein antigen
- Immune response to tumours
- Cancer immunotherapy
    - Cytokine therapy
    - Interferon therapy
    - Tumour necrosis factor therapy
    - Monoclonal antibody-based therapies
    - Anti-cancer vaccines

Additional laboratory-lecture topics in Immuno-Diagnostic Formats:

- *Radioimmunoassay (RIA)*
- *Immunofiltration assays*
- *Immunochromatographic assays*
- *Affinity chromatography*
- *Immuno-electron microscopy*
- *Immuno-fluorescence microscopy*
- *Fluorescence-activated cell sorter.*

Laboratory & Test Schedule

Please thoroughly read the introductory material and experimental protocol(s) in preparation for each experiment. Making a flow chart for each experiment is ideal.

Friday, September 9th
Introductory information on the laboratory component of the course: orientation; overall perspective; equipment use.
Lab-lecture on general nature of antibodies and antigens.

Friday, September 16th
Pre-Lab Talk: Nature of Precipitin Reactions
Gel Immunodiffusion and the Identification of Antigens by Precipitin Reactions
Experiment 1. **The Ouchterlony Reaction**
Experiment 2. **The Radial Immunodiffusion (RID) Assay**
Relevant lecture material also will be presented in this lab period.

Friday, September 23rd
Experiment 1 (continued). **Interpretation of the Ouchterlony Reactions**
Experiment 2 (continued). **Interpretation of the Radial Immunodiffusion Assay**

Pre-Lab Talk: Nature of Agglutination Reactions
Experiment 3. Identification of *Aeromonas salmonicida* by Latex Bead Agglutination Assay

Experiment 4. Detection of *Aeromonas salmonicida* Antigens, and Determination of Anti-*A. salmonicida* Polyclonal Antibody Titer Using an Indirect ELISA
Part 1. Coating the ELISA plates with antigen

Friday, September 30th
Pre-Lab Talk: Principles of ELISA.
Experiment 4. Detection of *Aeromonas salmonicida* Antigens, and Determination of Anti-*A. salmonicida* Polyclonal Antibody Titer Using an Indirect ELISA
Part 2. Conducting the ELISA
Interpretation and discussion of ELISA results will occur in the following lecture period.
Friday, October 7th.
Pre-Lab Talk: SDS-PAGE in Western Blotting for the Detection of Specific Antigens.
Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins
Part I. SDS-polyacrylamide gel electrophoresis separation of proteins

Tuesday, October 11th. (the following lecture period)
Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins
Part II. Electrophoretic transfer of proteins onto nitrocellulose

Friday, October 14th. **Term Test 1** 1:30 PM to 3:20 PM, Room F360

Friday, October 21st.
Pre-Lab Talk: Western Blotting for the Detection of Specific Antigens.
Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins
Part III. Immuno-detection of antigens on western blots

Friday, October 28th.
Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins
Post-Lab Discussion - Interpretation of western blotting results

Pre-Lab Lecture: Creating Hybridomas for Producing Monoclonal Antibodies (MAb's)
Experiment 9. Differentiation and Titer Determination of Atlantic Salmon and Rainbow Trout Sera Using Monoclonal Antibodies in an ELISA Assay
Part I. Dilution of antigens, and coating of microtiter plates

Friday, November 4th.
Experiment 9. Differentiation and Titer Determination of Atlantic Salmon and Rainbow Trout Sera Using Monoclonal Antibodies in an ELISA
Part II. Conducting the ELISA
Interpretation and discussion of ELISA results will occur in the following lecture period.

Friday, November 11th. **Remembrance Day Holiday**

Friday, November 18th. **Term Test 2** 1:30 PM to 3:20 PM, Room F360

Friday, November 25th.
Lab lecture & demonstrations - Introduction to techniques for the propagation of tissue cultures and use of laminar flow hood and biosafety hoods for sterile tissue culture work.
Logistical organization of the experimental work in the following period.

Friday, December 2nd.
Experiment 10. Monoclonal Antibody Production and Mab Characterization
Part 1. Propagation of Monoclonal Antibody Producing Hybridoma Tissue Cultures**.**

Friday, December 9th.

Experiment 10. Monoclonal Antibody Production and Characterization (continued).

Part 2. Immuno-chromatography Isotyping of the Monoclonal Antibodies (MAb's) in the Hybridoma Tissue Culture Supernatants

Lab Lecture - Comparison of immunological techniques used for lab-based, field-based and OTC Immunodiagnostic assays. Final Exam Review Session

Final Exam: The time and location of the Chem 251 Final Exam will be published by the College during the Fall Semester.

5. Basis of Student Assessment (Weighting)

(a) Tests

Term Test #1

This test covers relevant material from approximately the first third of the course, including the laboratory component. The delineation of material students are responsible for will be provided in class about one week before the date of the test. This is a 110 min. test that will be written on Friday, October 14th from 1:30 PM to 3:20 PM in F360. Students may choose to use the remainder of the lab period if they like. The results of this test contribute to **25%** of the final grade.

Term Test #2

This test covers relevant material from approximately the second third of the course, including the laboratory component. The delineation of material students are responsible for on this test will be provided in class about one week before the date of the exam. This is a 110 min. test that will be written on Friday, November 18th from 1:30 PM to 3:20 PM in F360. Students may choose to use the remainder of the lab period if they like. The results of this test contribute to **25%** of the final grade.

If either of the term exams is missed due to illness, or other justifiable reason, with accompanying documentation then the percentage value of that term exam (25%) will be added to the percentage value of the final exam.

(b) **Final Exam**

The final exam is a comprehensive exam that includes components from the laboratory section of the course. The value this exam contributes to the final grade is **45%**. The time and location of the final exam will be published by the College during the Fall Semester. *(Please note that the exam time and date will not be changed by the college to accommodate vacation or similar personal plans.)*

Attendance at the final exam is mandatory. Appropriate documentation must accompany any explanation for absence if an incomplete grade (I grade) is warranted for medical or other justifiable reason.

(c) Other

Laboratory Experiments

Attendance in the lab periods is mandatory. No laboratory experiment can be missed without an acceptable reason submitted in writing, such as a proper letter from a MD.
Laboratory participation and performance contributes **5%** to the final grade.

Please come to each lab period prepared for the experiment.
There are no laboratory reports due for the experiments but *students are responsible for understanding the principles, technical bases, and results of each experiment*. These aspects of the laboratory work will be subject to examination on the term tests and the final exam.

6. Grading System

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	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

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 E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: 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	*In progress*: A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
CW	*Compulsory Withdrawal:* 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.

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

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**.
It is the student's responsibility to become familiar with the content of this policy.
The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.

Please Note:
Students may not use recording devices in the classroom without the prior permission of the instructor or DRC. The instructor's permission is not required when the use of a recording device is sanctioned by the College's Disabilities Resource Centre for Students in order to accommodate a student's disability, and when the instructor has been provided with an instructor notification letter which specifies the use of a recording device. Such recordings made in the classroom are for the student's personal use only, and distribution of recorded material is prohibited. Recordings made during the course would include statements, questions and comments made by students in the class, and these are not to be disseminated or repeated in any manner based on the recordings.

Please have cell phones turned off and put away while in lectures. Thank you.