

COURSE SYLLABUS



COURSE TITLE: CHEM-251-Immunology

CLASS SECTION: 001

TERM: 2024F

COURSE CREDITS: 3

DELIVERY METHOD(S): In Person

Camosun College respectfully acknowledges that our campuses are situated on the territories of the Ləkʷəŋən (Songhees and Kosapsum) and WSÁNEĆ peoples. We honour their knowledge and welcome to all students who seek education here.

INSTRUCTOR DETAILS

NAME: ARMANDO JARDIM

EMAIL: jardima@camosun.ca

OFFICE: F348D Fisher Building, Lansdowne Campus

HOURS: Monday 2:30 - 3:30 pm
Wednesday 2:30 - 3:30 pm
Thursday 2:30 - 3:30 pm
Friday 8:30 – 9:30 am

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

This course describes the basic concepts of immunology and the application of immunochemistry to molecular, medical and veterinary biotechnology. Topics include: antigens and antibody-based, immune responses, vaccines, antibody diagnostics, immunosuppression, hypersensitivity, transplants, cancer, auto-immune diseases, immunodeficiencies (including AIDS) and current immunological techniques.

PREREQUISITE(S):

All of:

C in CHEM 120

CO-REQUISITE(S):

EQUIVALENCIES:

COURSE LEARNING OUTCOMES / OBJECTIVES

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

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.

Compare and contrast various types of antibody-based diagnostic tests, and various vaccine formulations.

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.

Evaluate experimental design, design control experiments, and interpret data arising from basic immunological technologies.

Work in a biosafety level-1 laboratory.

Prepare, handle and store many types of solutions, buffers, reagents, and equipment used immunological experimentation.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Course textbook – Immune System 5^{ed}, Peter Parham, W.W. Norton & Company - A copy of the textbook may be purchased from the Lansdowne Campus bookstore.

Laboratory Manual and the Lecture slides - required course slides can be downloaded from D2L.

Safety glasses - Safety glasses are required when handling hazardous chemicals, and are recommended when handling laboratory glassware. Each student is required to provide her or his own pair of safety glasses. Students lacking safety glasses when they are required will not be permitted in the laboratory. Prescription glasses will suffice.

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.

Disposable plastic gloves - Disposable, plastic, 'non-allergenic' gloves will be available in the laboratory and are to be used to protect the skin from potentially hazardous chemicals or to protect biochemicals from degradative enzymes present on the skin.

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

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

Course Times:

Monday lecture	3:30 – 4:20 pm F200
Tuesday lecture	3:30 – 4:20 pm F200
Wednesday lecture	3:30 – 4:20 pm F200
Thursday lab	8:30 – 11:20 pm F360

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

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES Slides covered (approx.)
Week 1 Sept 3 -6	Early historical evidence of immunity in humans <ul style="list-style-type: none"> o Earliest evidence of the phenomenon of 'immunity' o Recognition of the four basic tenants of adaptive immunity Variolation & the early evidence of vaccination Development of Jenner's smallpox vaccine	1-22
Week 2 Sept 9 -13	Classes of pathogens Neglected diseases Description of the immune system <ul style="list-style-type: none"> • Innate, adaptive, humoral and cellular arms. Hematopoietic Stems Cells, Major cellular components of the immune system, Arms of the immune system and immune response, Innate immune system Physical barriers, defensive chemical	23-55
Week 3 Sept 16 - 20	Innate immune system <ul style="list-style-type: none"> • Defensive chemicals (continued) Role of gut microbiota in innate immunity Complement pathway: Classical, Alternative, and Lectin <ul style="list-style-type: none"> • Role of complement in immune complex clearance, Membrane attack complex, Role of complement fragments, Regulation of complement pathway, Immune response to cellular compartments Role of phagocytes in innate immunity	56-89
Week 4 Sept 23 -27	Role of phagocytes in innate immunity (continued) Phagocytosis and pathogen killing, Origins of the immune system, Toll receptors in immune system, Pathogen associated molecular patterns (PAMP), Toll receptors - structure and ligand binding, TLR and NOD signalling, Inflammatory response, role of Natural killer (NK) cells in the inflammatory responses, killing mechanism of NK cells, cytokines, cytokines in the inflammatory response, C-reactive protein, interferons	90-123

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES Slides covered (approx.)
Week 5 Sept 30 – Oct 4	Monday September 30, 2024 (closed) National Day for Truth and Reconciliation Adaptive immunity Antigen receptor and the B cell receptor, production of B-cells, antibody structure and characteristic of antibody subclasses, alternative forms of antibodies, carbohydrates in antibodies, antibodies in fetus and infant immunity, structure of antibody binding site, Primary humoral response, epitope-antibody binding, genetics of antibody production	124-157
Week 6 Oct 7 - 11	Genetics of antibody production (continued), genetic rearrangement of heavy chain, genetic rearrangement of light chain, antibody diversity and antigen recognition, B-cell development, B-cell activation, clonal selection of B-cells, class switching, affinity maturation, memory cell development and secondary humoral response, antibody synthesis, memory cells and secondary response, B cell tolerance	158-191
Week 7 Oct 14 - 18	TERM TEST 1. 8:30 AM to 11:20 AM in F360/F358 (taken in lab session) Monday October 14, 2024 (closed) Thanksgiving B-cell maturation in secondary lymphoid organ, monoclonal antibodies, T cell development, T cell receptor development, T cell receptor complex, major Histocompatibility Complex (MHC), antigen presentation	192-225
Week 8 Oct 21 - 25	Antigen presentation on MHC, superantigen, co-receptor complex formed with MHC I and MHC II. Antigen presenting cells, antigen processing and presentation, mechanism of intracellular signaling, T cell activation	226-259
Week 9 Oct 28 – Nov 1	T cell subsets, CD4+ T cell regulation, CD8+ T cell regulation, co-stimulatory molecules, secondary lymphoid tissues, lymph nodes, spleen, mucosa associated lymphoid tissue, skin associated lymphoid tissue, integration of innate and adaptive immunity	260-290
Week 10 Nov 4 - 8	Defects in host immunity, defects in immune system-HIV, allergy and allergic disease, hypersensitivity, autoimmune disorders	291-327
Week 11 Nov 11 - 15	Monday November 11, 2024 (closed) Remembrance Day Hypersensitivity and autoimmune disorders (continued)	328-361
Week 12 Nov 18 - 22	TERM TEST 2 8:30 AM to 11:20 AM in F360/F358 (taken in lab session) Immune tolerance, transplantation immunity	362-395
Week 13 Nov 25 - 29	Transplantation immunity (continued), vaccines and vaccination, types of vaccines	396-429
Week 14 Dec 2 - 6	Types of vaccines (continued), immune evasion, immunotherapy for cancer Final exam review	430-462

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 can be reviewed on the [CAL exams page](https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams).
<https://camosun.ca/services/academic-supports/accessible-learning/academic-accommodations-exams>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
<p>Term Test 1</p> <p>This term test covers relevant material from approximately the first third of the course. The delineation of material that students are responsible for, including that from the laboratory section of the course, will be provided in class about one week prior to the date of the test. This is a 110-minute test that will be written during the lab period on Thursday, October 17th from 8:30 to 11:20 am in F360/F358. If this term test is missed due to illness, or a similarly justifiable reason, with accompanying documentation the percentage value of that term test will be added to the value of the final exam.</p>	25%
<p>Term Test 2</p> <p>This term test covers relevant material from approximately the second third of the course. The delineation of material that students are responsible for, including that from the laboratory section of the course, will be provided in class about one week before the date of the test. This is a 110-minute test that will be written during the lab period on Thursday, November 21 from 8:30 to 11:20 am in F360/F358. If this term test is missed due to illness, or a similarly justifiable reason, with accompanying documentation the percentage value of that term test will be added to the value of the final exam</p>	25%
<p>Laboratory Experiments</p> <p>Laboratory participation and performance contributes 7.5% to the final grade. Attendance in the lab periods is mandatory. No laboratory experiment can be missed without an acceptable reason submitted in writing, such as a letter from a MD. Pre-lab assignments and flowcharts also contribute to a total of 7.5% of the final grade. Please come to each lab period prepared for the experiment. Understanding of the principles, scientific and technical bases, and results of each experiment is subject to examination on term tests and the final exam. One must pass the laboratory portion of the course to be able to pass the course.</p>	15%
<p>Final Exam</p> <p>The final exam is a comprehensive exam that includes components from the laboratory section of the course. The time and location of the final exam will be published by the College during the semester. Attendance at the final exam is mandatory. Appropriate documentation must accompany an explanation for absence if an incomplete grade (I grade) is warranted.</p>	35%
<p>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 policy for more information.</p> <p>https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf</p>	<p>TOTAL</p> <p>100%</p>

COURSE GUIDELINES & EXPECTATIONS

Students may **NOT** use recording devices in the classroom without the prior permission of the instructor or the Centre for Accessible Learning. The instructor's permission is not required when the use of a recording device is sanctioned by the College's Centre for Accessible Learning 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. Otherwise, **please have cell phones turned off and put away while in lectures**. Thank you.

SCHOOL OR DEPARTMENTAL INFORMATION

Here is a link to the Science Help Centre.

<https://camosun.ca/services/academic-supports/help-centres/science-help-centres>

The schedule for the Chem Tutors will be posted during the semester.

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 camosun.ca/services.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards

Support Service	Website
Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

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 Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities: <https://camosun.libguides.com/academicintegrity/welcome>
Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf> for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

Academic Accommodations for Students with Disabilities

Camosun College is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging appropriate academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a

student with a documented disability and think you may need accommodations, you are strongly encouraged to contact the Centre for Accessible Learning (CAL) and register as early as possible. Please visit the CAL website for more information about the process of registering with CAL, including important deadlines: <https://camosun.ca/cal>

Academic Progress

Please visit <https://camosun.ca/sites/default/files/2023-02/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 <https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <https://camosun.ca/registration-records/tuition-fees#deadlines>.

Grading Policy

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

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 (see [Medical/Compassionate Withdrawals policy](#)). Please visit <https://camosun.ca/services/forms#medical> to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence

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 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 Policy: <https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf> and camosun.ca/services/sexual-violence-support-and-education.

To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

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 <https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Looking for other policies?

The full suite of College policies and directives can be found here: <https://camosun.ca/about/camosun-college-policies-and-directives>

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.