COURSE SYLLABUS

COURSE TITLE: CHEM-251: Immunology

CLASS SECTION: 001

TERM: 2023F

COURSE CREDITS: 4

DELIVERY METHOD(S): In Person

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.

INSTRUCTOR DETAILS

NAME: ARMANDO JARDIM, Ph.D.

EMAIL: ajardim@camosun.ca

OFFICE: F348D Fisher Building, Lansdowne Campus

HOURS:

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):

EXCLUSION(S):

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course a 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 immunological experimentation.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Laboratory Manual, Selected Course Notes and Lecture Slides. 2023 Edition. This required course slides can be downloaded from D2L. The laboratory manual, selected course notes, and lecture slides can be purchased from the Lansdowne Campus bookstore.

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 when appropriate to protect the skin from potentially hazardous chemicals or to protect biochemicals from degradative enzymes found 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 12:30 – 1:20 pm F212

Wednesday lecture 12:30 – 1:20 pm F212

Thursday lab 2:30 – 5:20 pm F360

Friday lecture 12:30 – 1:20 pm F212

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 1	Thursday Lab, September 7th Introduction to experimental immunology. Lab-lecture: *The structural characteristics of antibodies.*	
Week 2	Thursday Lab, September 14th Lab-lecture: The nature of antigens. Pre-Lab Talk: The identification of antigens by precipitin reactions. **Experiment 1. The Ouchterlony Reaction** **Experiment 2. The Radial Immunodiffusion (RID) Assay**	
Week 3	Thursday Lab, September 21st Lab-lecture: Classes of antibodies. **Experiment 1. Interpretation of Ouchterlony reactions. Experiment 2. Interpretation of RID results.** Pre-Lab Talk: The 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.**	
Week 4	Thursday Lab, September 28th 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	
Week 5	Thursday Lab, October 5th Pre-Lab Talk: SDS-PAGE in Western Blotting for the Detection of Specific Antigens. **Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins.** Part 1, SDS-polyacrylamide gel electrophoresis separation of proteins (the following lecture period) **Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins.** Part 2, Electrophoretic transfer of proteins onto nitrocellulose	

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 6	Thursday Lab, October 12th Pre-Lab Talk: Western Blotting for the Detection of Specific Antigens. **Experiment 5. Western Blotting Analysis of *Aeromonas salmonicida* Proteins** Part 3, Immunodetection of antigens on western blots.	
Week 7	Thursday Period Lab, October 19th **TERM TEST 1.** 2:30 AM to 4:20 AM in F360/F358	
Week 8	Thursday Lab, October 26th **Experiment 6. Propagation of CHO Cells in Tissue Culture** 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	
Week 9	Thursday Lab, November 2nd **Experiment 6. Propagation of CHO Cells in Tissue Culture** Part 1, Subculturing tissue cultures	
Week 10	Thursday Lab, November 9th **Experiment 6. Propagation of CHO Cells in Tissue Culture**. Part 3, Examination of tissue cultures **Experiment 7. ELISA Detection of Hsp70 Expression in CHO Cells Treated with Heat or Oxidative Stress.** Part 1, Cell treatment, harvesting and lysis Part 2, Coating of ELISA plates	
Week 11	Thursday Lab, November 16th **Experiment 7. ELISA Detection of Hsp70 Expression in CHO Cells Treated with Heat or Oxidative Stress.** Part 3, Conducting the ELISA for Hsp70	
Week 12	Thursday Lab, November 23rd **TERM TEST 2 2:30 AM to 4:20 AM in F360/F358**	
Week 13	Thursday Lab, November 30th Pre-Lab Lecture: Creating Hybridomas for Producing Monoclonal Antibodies (MAb's) **Experiment 10. Monoclonal Antibody Production and Characterization**. Part 1, Propagation of Monoclonal Antibody Producing Hybridoma Cell Tissue Cultures	

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 14	Thursday Lab Period, December 7th **Experiment 10. Monoclonal Antibody Production and Characterization**. Part 2, Immunochromatography Isotyping of the Monoclonal Antibodies (MAb's) in the Hybridoma Cell Tissue Culture Supernatants Post-lab Lecture - Comparison of immunodiagnostic formats for lab-based, field-based and OTC assays **Final exam review**	

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. http://camosun.ca/services/accessible-learning/exams.html

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Term Test 1 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 19th from 2:30 to 4:20 PM 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.	25%
Term Test 2 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 23rd from 2:30 to 4:20 PM 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	25%

DESCRIPTION	WEIGHTING
Laboratory Experiments 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.	15%
Final Exam 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.	35%
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 Grade Review and Appeals policy for more information. http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

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 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.

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. 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.