

Integrated Research Course I/II
MDSC417.02/MDSC419.02 Microbiology, Immunology and Infection
MDSC417.05/MDSC419.05 Biochemistry and Molecular Biology
MDSC417.06/MDSC419.06 Physiology & Pharmacology

Course co-ordinators:

MDSC417: Dr. Pierre-Yves von de Weid (vonderwe@ucalgary.ca) - Phone: 403-220-7967

MDSC419: Dr. Guido van Marle (vanmarle@ucalgary.ca) - Phone: 403-210-3923

Instructors:

MDSC417.02/MDSC419.02 Microbiology, Immunology and Infection

Dr. Nathan Peters (ncpeters@ucalgary.ca)

MDSC417.05/MDSC419.05 Biochemistry and Molecular Biology

Dr. Frank Jirik (jirik@ucalgary.ca)

MDSC417.06/MDSC419.06 Physiology and Pharmacology

Dr. Vaibhav Patel (vaibhav@ucalgary.ca)

Office Hours/Policy on Answering Student Emails

Office Hours are by appointment only. The instructors will respond to emails received during working hours by the next working day.

Time:

Tuesdays & Thursdays 1:00pm to 3:50pm

The sessions for MDSC417/419 will be given in person, as described in the course schedule posted on Brightspace (by D2L).

Please consult course schedule to confirm the nature and subjects covered in individual sessions.

MDSC417 will involve primarily classroom sessions and individual/small group meetings and potentially some lab-based training sessions.

MDSC419 will predominantly be laboratory-based.

Prerequisite/Co-Requisite:

MDSC 308 and MDSC 341, and enrolment in the Bachelor of Health Sciences program

Anti-requisite:

MDSC 402. Credit may not be obtained for both MDSC402 and MDSC417.

Note:

MDSC417 is to be taken in combination with the MDSC419, as described in the University Calendar.

Course Description:

Provides students with the basic conceptual framework, knowledge and skillset to work and think independently in a medical science or life science research environment in their topic area. The course will include lectures in the various topic areas, group sessions and self-directed research project in the topic area.

Overarching Theme

These combined courses provide students with the basic conceptual framework, knowledge and skill set to work and think independently in a biomedical research environment in selected topic areas. The course will include lectures, group sessions and a self-directed research project in the selected topic areas.

Global Objectives

- To give students a comprehensive introduction to the conceptualization, formulation, execution and completion of a research project.

Course Learning Outcomes

By the end of MDSC417, students will be able to:

1. Demonstrate an understanding of the broader context of their research project area.
2. Search current literature effectively in the context of their proposed research project
3. Investigate and evaluate the existing evidence in the context of their chosen subject area of study, clearly state the problem to be investigated, and provide rationale for the proposed research.
4. Understand research design and conceptualize a research project from beginning to end.
5. Evaluate the appropriateness and limitations of using various experimental approaches and research designs.
6. Develop a research project within the defined context of their chosen subject area.
7. Write a research proposal outlining a cohesive set of experiments.
8. Formulate strong, focused, and testable research questions/hypotheses and propose methods to test the hypotheses in the context of their chosen subject area.

By the end of MDSC419, students will be able to:

1. Demonstrate knowledge and understanding of a number of laboratory techniques relevant to their area of study/specialization and successfully perform these techniques in a research setting.
2. Apply the gained knowledge to troubleshoot and ultimately correct technically-based problems that arise during a research project.
3. Critically analyze data obtained from experiments.
4. Combine and interpret data obtained from various experiments
5. Discuss the limitations of the data obtained.
6. Propose further lines of investigation.
7. Discuss the data obtained in the broader context of their research project area.
8. Successfully execute a research project.
9. Work in a team to tackle a research project.
10. Give a scientific presentation of their research project to audience of peers
11. Write a final research report summarizing their findings in an academically rigorous, coherent and cohesive fashion.

Transferable Skill Development:

Many of the skills and abilities that you are developing in your coursework are transferable to the workforce, graduate and professional studies and other facets of life. Employers seek applicants with transferable skills because they can be an asset in the workplace, regardless of industry or sector. Transferable skills are core skills for your success in building your future career.

The work that you will do in MDSC417/419 will help you build the following transferable skills:

- **Collaboration:** Work respectfully with others from different backgrounds, cultures, and countries.
- **Verbal Communication:** Learn and share information by presenting, listening, and interacting with others.
- **Creativity and Innovation:** Find different and better ways to do things, being curious, thinking imaginatively.
- **Critical Thinking:** Actively and skillfully conceptualize, apply, analyze, synthesize, and/or evaluate information (data, facts, observable phenomena, and research findings) to make a reasoned judgement or draw a reasonable conclusion.
- **Digital Skills:** Use digital technologies like computers, social media, virtual meeting platforms, and the internet.
- **Project Management:** Conceptualize, initiate, plan and execute a plan to achieve a predetermined goal (project) by effectively prioritizing activities and meeting deadlines.
- **Written Communication:** Share ideas and information by using words, images, and symbols.

Learning Resources

Recommended Textbooks/Readings

There are no recommended textbooks but there will be several required readings that will be posted on Brightspace (by D2L).

A Note regarding readings

A list of required readings will be outlined on D2L and links and documents will be made available, where possible. Required readings have been chosen carefully to inform you and enhance the lecture material. **Students are REQUIRED to complete assigned readings BEFORE each lecture.** Instructors will proceed in class on the assumption that students have read completely the assigned readings. Students should be aware that many of the readings they will be assigned may be of an unfamiliar nature and style. Students should allot sufficient time to allow for several reads of the assigned material.

Learning Technology Requirements

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. **It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L.** Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

Evaluation

The University policy on grading and related matters is described in section F of the 2023-2024 Calendar.

You will receive a grade for MDSC417 and MDSC419 separately

Details for each assignment will be provided in class.

In determining the overall grade in the course, the following weights will be used:

MDSC417

- **Literature search assignment**

10% (Sept. 11, 2025)

This assignment will be given in class through Brightspace (D2L) through several guide questions and you will have limited time frame (2 hrs) to answer the assignment questions given.

- **Abstract writing assignment**

10% (Sept 18, 2025)

This assignment will be given in class through the Brightspace (D2L) platform. You will need to write an abstract following several guided questions. You will have limited time frame (2 hrs) to write the abstract.

- **Subject-specific summary and significance paper
and short research paper summaries throughout class**

20% (Oct 14, 2025)

- **Letter of Intent (1 pg single-spaced)**

10%

- **Draft (0%) (Oct 23, 2025)**

- **Final LOI (value 10%) (Oct 30, 2025)**

- **Grant Reviews**

10% (Nov. 22, 2025)

- **Research Proposal (5 pg single spaced)**

40%

- **Draft (10%) (Nov. 18, 2025)**

- **Final Proposal (30%) (Dec. 5, 2025)**

- **To include work distribution statement and
project timeline**

MDSC419

- **Lab Notebook**

25%

1st Assessment (15%, due Feb 19, 2026)

2nd Assessment (10%, due April 17, 2026)

- **Lab Performance**

25%

1st Assessment (15% Feb 19, 2026)

2nd Assessment (10%, due April 17, 2026)

- **Final Oral Presentation**

20% (on April 14, 2026)

- **Final Report**

30% (on April 17, 2026)

****There will be no December or April exams for these courses**

A student's final grade for the course is the sum of the separate assignments. It is not necessary to pass each assignment separately in order to pass the course.

A Note regarding Writing Assignments:

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2025-26 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). Sources used in research papers must be properly documented. The University of Calgary offers instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

Grading Scheme:

Letter Grade	Description	Percentage
A+	Outstanding performance	96-100
A	Excellent performance	90-95.99
A-	Approaching excellent performance	85-89
B+	Exceeding good performance	80-84
B	Good performance	75-79
B-	Approaching good performance	70-74
C+	Exceeding satisfactory performance	65-69
C	Satisfactory performance	60-64
C-	Approaching satisfactory performance	57-59
D+	Marginal pass	54-56
D	Minimal pass	50-53
F	Does not meet course requirements	0-49

Missed Components of Term Work:

At each instructor's discretion, late assignments will lose 5% per day late past the deadline for all assignments. Late assignments will **NOT** be accepted more than 72 hours after the posted deadline and students failing to submit any assignment within this time frame will receive a mark of zero.

Students who miss a quiz or in class assignment will receive a mark of zero unless the instructor has been previously notified. There will be NO exceptions to this policy.

NOTE: There will be no make-up in class assignments. If you miss an in-class assignment for a legit reason the weighting of the assignment will be combined with the next assignment.

*As per University Calendar Section G.2.3, **students who are absent from an in-class assessment will receive a mark of zero on the missed component.** Students who are absent are responsible for contacting their instructor to discuss the impact of their missed assessment. Alternative opportunities for*

completing missed assessments or shifting of the assessment weight **may** be possible but are not guaranteed. Students who are identified as falsifying information related to missed assessments will be subject to investigation for academic misconduct.

Extensions will NOT be granted on any assignment or quizzes in MDSC417/MDSC419. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class, meetings and examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar

<https://calendar.ucalgary.ca/pages/02ffccb6b1a541db880fe4223d122b5e>

Course Evaluations and Student Feedback

Student feedback will be sought at the end of the course through the Universal Student Rating of Instruction (USRI) and a qualitative student evaluation. Students are welcome to discuss the process and content of the course at any time with the instructor. Students may also address any concerns they may have with Dr. Fabiola Aparicio-Ting, Associate Dean (Undergraduate Health and Science Education) in the Cumming School of Medicine (feaparic@ucalgary.ca).

Attendance

We request that you notify your supervisor and the course coordinator, Dr. Pierre-Yves von der Weid, directly (not via peers) if you are unable to attend, and explain your absence. **Full time lab attendance/participation will be monitored and is part of your performance grade for MDSC419.**

REQUIRED MATERIALS:

A lab coat and hard-covered lab notebook (available at the bookstore) are both required for MDSC 417 and 419.

LABORATORY NOTEBOOK:

The laboratory notebook should be updated before, during and/or after each laboratory session in accordance with the guidelines provided by each research supervisor. Ensure that your lab notebook is kept up to date, and results are clearly presented and explained. The laboratory notebooks will be graded as part of your final grade for MDSC419.

THE LABORATORY NOTEBOOK IS THE PROPERTY OF THE SUPERVISOR OF THE LABORATORY YOU ARE WORKING IN FOR YOUR PROJECT AND WILL REMAIN IN THE HOST LABORATORY AT THE END OF THE COURSE.

LABORATORY SAFETY:

Students are required to familiarize themselves with the Bachelor of Health Sciences Guidelines for Safety Procedures (posted on Brightspace (D2L)) and follow laboratory safety of the particular procedures of the laboratory they work in at all times. Students who do not follow the laboratory safety procedures will be asked to leave the lab. Students must have completed WHMIS 2015 and Biosafety Laboratory Training in order to work in the laboratory. Students may be required to have additional laboratory safety training specific to the laboratory they will be working in as part of their project.

GENERAL LABORATORY AND SAFETY CONCERNS:

It is important that students direct all immediate questions and concerns regarding the laboratory portion of the course to their laboratory supervisor. If the supervisor is unable to provide an explanation or answer, then the student should contact Dr. Peters, Dr. Jirik, or Dr. Patel depending on the section you are enrolled in.

Conduct During Lectures

The classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at <https://www.ucalgary.ca/student-services/student-conduct/policy>.

Students are expected to take notes during class and should not rely solely on material supplied by the instructors. Instructors may or may not post lectures notes to D2L, at their individual discretion. Instructors may cover concepts or examples in class that may not be posted to D2L but may be assessed.

Use of Internet and Electronic Communication Devices in Class

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. However, research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of others during class time.

Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-electronic-resources-and-information-policy>.

Use of Artificial Intelligence Tools

The use of generative artificial intelligence tools and apps is **strictly prohibited** in all course assignments unless explicitly stated otherwise by the instructor in this course. This includes ChatGPT and other AI writing and coding assistants. Use of generative AI in this course may be considered use of an unauthorized aid, which is a form of cheating and a breach of academic integrity subject to Academic Misconduct procedures. You could be asked to provide evidence of your own work.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

Copyright

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy>) and requirements of the Copyright Act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks,

etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy <https://www.ucalgary.ca/pubs/calendar/current/k.html>.

Instructor Intellectual Property

Course materials created by instructors (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may **NOT** be reproduced, redistributed or copied without the explicit consent of the professor. **The posting of course materials to third party websites such as note-sharing sites without permission is prohibited.** Sharing of extracts of these course materials with other students enrolled in the course **at the same time** may be allowed under fair dealing.

Academic Accommodations

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>. Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>). SAS will process the request and issue letters of accommodations to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to Dr. Fabiola Aparicio-Ting (feapartic@ucalgary.ca), Associate Dean (Undergraduate Health and Science Education).

Academic Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned.

Academic Misconduct refers to student behaviour that compromises proper assessment of a student's academic activities and includes (but is not limited to): cheating, fabrication, falsification, plagiarism, unauthorized assistance, failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses, and failure to comply with exam regulations applied by the Registrar. **It also includes using of third party websites/services to access past/current course material, essay/assignment writing services, or real-time assistance in completing assessments, seeking answers to assessment questions and similar, whether paid, bartered or unpaid.**

For information of the Student Academic Misconduct Policy and Procedures, please visit: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy>.

Additional information is available on the Academic Integrity website at: <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

Recording of Lectures

Audio or video recording of lectures (or similar) is prohibited except where explicit permission has been received from the instructor.

Freedom of Information and Protection of Privacy Act

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

Appeals

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<http://www.ucalgary.ca/student-services/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade.

<https://calendar.ucalgary.ca/pages/e31a7115dca740ec83579e946d4a4193>

Sexual and Gender-Based Violence Policy

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>.

Resources for Support of Student Learning, Success, Safety and Wellness

Student Success Centre <http://www.ucalgary.ca/ssc/>

Student Wellness Centre <http://www.ucalgary.ca/wellnesscentre/>

Student Advocacy and Wellness Hub (CSM)

<https://cumming.ucalgary.ca/mdprogram/current-students/student-advising-wellness>

Distress Centre <http://www.distresscentre.com/>

Library Resources <http://library.ucalgary.ca>

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (<https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy (<http://www.ucalgary.ca/mentalhealth/>).

Student Ombuds' Office

The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit www.ucalgary.ca/student-services/ombuds/ or email ombuds@ucalgary.ca

BHSc Student Faculty Liaison Committee (SFLC)

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

Student Union (SU) Information

The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; the SU representatives for the Cumming School of Medicine can be reached at medrep1@su.ucalgary.ca or medrep2@su.ucalgary.ca.

Student Success Centre

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>

Emergency Evacuation/Assembly Points

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is given to the warden in charge of the Assembly Area. For more information, see <https://www.ucalgary.ca/risk/emergency-management/drills/assembly-points-and-evacuation-maps>

Safewalk

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.