

MDSC 402
Organismal Biology (in Medical Research)

Course Coordinator

Dr. Lian Willetts (lian.willetts@ucalgary.ca)

Instructors

Dr. Lian Willetts (lian.willetts@ucalgary.ca)

Dr. Jennifer Thompson (Jennifer.thompson2@ucalgary.ca)

Dr. Paul Mains (mains@ucalagry.ca)

Jasper Greysson-Wong (jgreysso@ucalgary.ca)

Dr. Lisa Deliu (lpdeliu@ucalgary.ca)

Dr. Kenneth Lukowiak (lukowiak@ucalgary.ca)

Office Hours/Policy on Answering Student Emails

Office hours with Dr. Lian Willetts or the teaching assistants are by appointment only. Please note that all communications must occur through your @ucalgary email and we will respond to emails sent via students' @ucalgary emails within 48 hours. **You must cc the entire teaching team on course related inquiries.**

Teaching Assistants

Technician and Lab Manager:

Deirdre Lobb (ddracas@ucalgary.ca)

Teaching Assistants:

Jordan King (Jordan.garcia@ucalgary.ca)

Time and Location

A class schedule is posted on the D2L site for the course and is updated whenever there are changes. Regularly scheduled classes are held Tuesday and Thursday from 13:00 – 16:00. For location of classes please check D2L.

Please consult course schedule to confirm location of individual sessions.

Prerequisite/Co-Requisite

Enrolment in the BHSc program, BIOL 241 and 243, and MDSC 351, or consent of the instructor.

Course Description

This course is inquiry-based and consists of lectures (15%), small group sessions (30%) and active research laboratory components (55%). The lectures and small group sessions cover topics include human anatomy and organismal biology and its utility in modern medical science research. This course provides a knowledge foundation of several established model organisms (*i.e.*, *C. elegans*, *drosophila*, chicken, and mice) used in current field of medical science research. Organismal structure from the cellular to the organism level in this course will focus on vertebrates with an emphasis on humans and human health. In this course, the learning of human anatomy is delivered in a flipped-classroom style

supported by hands-on small group sessions with cadaveric dissections curated by the Advanced Technical Skills Simulation Laboratory (ATSSL, <https://cumming.ucalgary.ca/atssl>).

In the active research laboratory component of the course, students will experience the fundamental aspects of medical health science research (*i.e.*, hypothesis generation, experimental design and implementation, data analysis, and effective scientific communication). Students are required to complete lab-based research project utilizing any of the organisms presented in the course as a research tool to answer a medical health-based scientific inquiry. This group research project in which students develop novel research projects that are largely undertaken at the end of the first term and in the second (winter) term forms an integral part of the course.

(*Note*: students in the course are not expected to participate as subjects or researchers when research on human subjects is undertaken.)

Overarching Theme

Application and integration of knowledge developed from topics discussed in the course in a student-driven and faculty-facilitated research project.

The topics discussed in the course are organized into following three categories:

- Introduction to model systems used to study developmental biology and human diseases.
- Introduction to human functional and clinical anatomy.
- Introduction to fundamental principles and practices of medical health science research.

Global Objectives

Research and educational activities in MDSC 402 are designed to:

- Develop a knowledge foundation of human anatomy and organismal biology in medical research.
- Develop research skills (*i.e.*, experimental design, implementation and data collection/analysis, effective communication, and teamwork).
- Obtain a better understanding of the scientific research process.

Course Learning Outcomes

By the end of this course, students will be able to:

- Compare and contrast the major organisms in modern medical science research.
- Describe the main location and function of the 6 anatomical systems introduced in the course (details see the following course schedule).
- Develop an original, testable, hypothesis driven biological or medical research question
- Formulate specific aims and objectives appropriate to the question being asked and propose experiments to address each specific aim
- Perform, analyze, interpret, and critically evaluate data and results from experiments proposed
- Provide appropriate explanations and suggest avenues for future research when results are inconclusive (or limited in their scope due to time constraints)
- Explain the significance of the research being proposed and the knowledge gained through inquiry
- Develop and deliver a clearly written proposal and final report using appropriate scientific format and style
- Develop and deliver engaging and well-organized oral presentations
- Present information in a clear and concise manner
- Evaluate peer's written and oral communication skills

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 MDSC 402 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.
- **Information Literacy:** Find, understand, and use information presented through words, symbols, and images
- **Problem solving:** Identify an issue, find and implement a solution, and assess whether the situation has improved.
- **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

No required textbook.

All images related to human anatomy content, unless otherwise noted, are from Gilroy AM et. al. Atlas of Anatomy, 1st – 4th edition. Thieme Publishers. Available here:
<http://www.thiemeteachingassistant.com.exproxy.lib.ucalgary.ca>

Recommended Textbooks/Readings

1. From DNA to Diversity, Carroll, S.B., Grenier, J.K. and Weatherbee, S.D.
2. Principles of Development, Wolpert, L.
3. from Gilroy AM et. al. Atlas of Anatomy, 1st – 4th edition. Thieme Publishers. Available here:
<http://www.thiemeteachingassistant.com.exproxy.lib.ucalgary.ca>

Required Textbooks/Readings

Required reading materials will be posted on 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.

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

	ITEM	WEIGHT
1	Model Organisms Quiz	10%***
2	Grant Proposal Letter of Intent (one page)	5%
3	Grant Proposal (five pages) - Faculty Evaluation	15%
4	Grant Proposal (five pages) - Student Evaluation (i.e. Overall Combined Rank at Grant Panels)	5%
5	Written Grant Reviews (one to two pages x2)	5%***
6	Weekly Anatomy Quiz (6x)	10%***
7	Comparative Anatomy in Medical Science Research Presentation	5%
9	Research Poster Presentation	5%
10	Final Data Presentation (Oral)	15%
11	Written Manuscript (<10 pages)	20%
12	Class Participation, attendance, & peer evaluations	5%***
		100%

** Note: no registrar-scheduled final examination*

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

Students who do not complete any component(s) prior to end of term will be considered as not having completed the course; this will be reflected on the students' official transcript as 'Incomplete'.

In the absence of medical or other documented reasons, the instructor reserves the right to award an 'Incomplete'

**** Individually evaluated.*

A Note Regarding Written 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 2023-24 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

Written assignments must be handed in by the deadline indicated in the course outline posted on D2L. **They are due at 1 pm on the day indicated** (unless otherwise communicated). Assignments should be placed in the drop-box in D2L electronically prior to the posted deadline. Assignments handed in late will be assigned an automatic penalty of 20% plus an additional 5% per day for each additional day (or part thereof) late. 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 will receive a mark of zero unless the instructor has been previously notified. *There will be NO exceptions to this policy.*

*It is the agreement of all Faculty involved in MDSC 402 that **extensions will NOT be granted** on any assignment or quizzes. 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://www.ucalgary.ca/pubs/calendar/current/e-4.html>).*

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 (eparic@ucalgary.ca).

Attendance

Individual attendance is strongly encouraged in all lectures and small group sessions, and it will be recorded on a random basis. Individual lab attendance is based on the specific arrangement agreed upon

by all members of the research group, lab manager and the teaching team. Attendance will inform a portion of your class participation grade.

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.

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/policies/files/policies/electronic-communications-policy.pdf> .

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

Copyright

All students are required to reach the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright-policy.pdf>) 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://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

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/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://www.ucalgary.ca/pubs/calendar/current/i-2.html>

Media Recording

Please refer to the following statement on media recording of students: https://elearn.ucalgary.ca/wp-content/uploads/2020/05/Media-Recording-in-Learning-Environments-OSP_FINAL.pdf

Media recording for lesson capture

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

Media recording for self-assessment of teaching practices

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

Media recording for the assessment of student learning

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

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/policies/files/policies/sexual-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/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/emergencyplan/building-evacuation/assembly-points>

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.

Class Schedule

The following is a list of topics for class, associated readings, and assignment / exam due dates. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements. The exam dates are firm and will not be altered.

DATE	LECTURE	Item(s) Due
5-Sep-23	Instructor introductions, course overview, Model organisms 1	
7-Sep-23	Model organisms 2	
12-Sep-22	Model organisms 3	
14-Sep-23	Model organisms 4	
19-Sep-23	Model organisms 5	
22-Sep-22	Model organisms 6	
26-Sep-23	Group Work (Developing Research Question)	
28-Sep-23	Group Work (Developing Research Question)	Model Organism Quiz
3-Oct-23	Grant Writing Workshop 1: Background and rationale	
5-Oct-23	Grant Writing Workshop 2: General hypothesis and specific aims	
10-Oct-23	Lab Safety & BHSc Lab Orientation	
12-Oct-23	Group Work (Developing Research Question)	
17-Oct-23		
19-Oct-23		
24-Oct-23		
26-Oct-23		
31-Oct-23		Workshop: Developing a Research Story
2-Nov-22	LOI Peer Review Workshop	
7-Nov-23	Group work	Letter of Intent due @ Midnight
9-Nov-23	Group work	
12-18-Nov-23	Term Break	
21-Nov-23	Group work	
23-Nov-23	Fundamentals of Human Anatomy 1	
28-Nov-23	Group work	
30-Nov-23	Fundamentals of Human Anatomy 2	
5-Dec-23	Group work	Grant Proposal Due @ Midnight
7-Dec-23	Fundamentals of Human Anatomy 3	
22 Dec - 2 Jan	Term Break	
9-Jan-24	Review 2 Grants/Group work	
11-Jan-24	Fundamentals of Human Anatomy 4	Grant Reviews for both grands due @ Midnight
16-Jan-24	Review Roundtable/Group work	
18-Jan-24	Fundamentals of Human Anatomy 5	
23-Jan-24	Group work	

25-Jan-24	Fundamentals of Human Anatomy 6	
30-Jan-24	Group work	
1-Feb-24	Fundamentals of Human Anatomy 7	Comparative Anatomy Presentation
6-Feb-23	Group work	
8-Feb-24	Statistics Workshop (2) - Platforms, Tools, and Making Figures/ Group work	
13-Feb-24	Group work	
15-Feb-24	Group work	
18-24 Feb 24	Term Break	
27-Feb-24	Poster Presentation Workshop/ Group work	
29-Feb-24	Poster Presentations, Journal Choice & Authorship Workshop	Poster Presentation
5-Mar-24	Group work	
7-Mar-24	Group work	
12-Mar-24	Group work	
14-Mar-24	Data Presentation Workshop/Group work	
19-Mar-24	Group work	
21-Mar-24	Group work	
26-Mar-24	Manuscript Formatting and Q&A/Group work	
28-Mar-24	Final Oral Presentations	Final Oral Presentation
2-Apr-24	Group work	
4-Apr-24	Group work	
9-Apr-24	Group work	Final Manuscript due @ Midnight