THE UNIVERSITY OF BRITISH COLUMBIA

Land Acknowledgement

We respectfully acknowledge the Syilx Okanagan Nation and their peoples, in whose traditional, ancestral, unceded territory UBC Okanagan is situated.

HES 321: Laboratory Techniques in Exercise Science

Instructor: Dr. Chris McNeil
Instructor's Email: chris.mcneil@ubc.ca (***use this email instead of Canvas messaging***)
Duration: Term 2 Winter 2025
Delivery Modality: In-Person
Course Location: ART 114
Course Days: Tue/Thu
Class Hours: 12:30-1:50pm
Office hours: By appointment (i.e., send an email and we'll arrange a time to meet)

Other Instructional Staff (Teaching Assistants; TAs)

- Alex Paish (adpaish@mail.ubc.ca)
- Jiawen Lim (jiawen13@student.ubc.ca)

Course Delivery

This course includes a lecture and lab component, both of which will be delivered **in-person**. Lab attendance is mandatory, and students are expected to attend lectures as well.

Lectures: Tuesdays and Thursdays from 12:30-2pm in ART 114
A skeleton version of lecture slides will be provided in advance of each topic, with the full version posted later. Lectures will not be recorded or livestreamed.

Labs: Thursdays 2-5pm (L01), Fridays 8-11am (L02), 11am-2pm (L03), 2-5pm (L04) in UCH 110
Students must attend their specific lab time. If a student will be absent, they must contact the TA for their lab section and me as soon as possible (ideally, before the lab takes place) in order to be excused. See *Missed Activity Policy* below for information about the consequences of an unexcused absence.

Course Description

Current methods in exercise science will be demonstrated via modules presented by faculty in their areas of specialization including electrophysiological techniques and methods of assessing blood-flow, respiratory capacity, and muscle function. Formerly offered as HMKN 312. Credit will be granted for only one of HES 321 or HMKN 312. [2-3-0].
Prerequisite: One of HES 305, HMKN 310.

Course Overview and Learning Objectives

This course focuses on a number of techniques used to assess human physiology, specifically in the context of health and exercise. Select methods used in respiratory, cardiovascular, cerebrovascular,

neuromuscular, and sensory motor physiology research will be covered throughout the term. Upon successful completion of this course, you will be expected to do the following:

1. Define and describe the basic technical principles of the methodologies introduced within this course (techniques covered within lectures and labs).
2. Identify strengths and limitations of each technique discussed within this course.
3. Describe appropriate conclusions (using physiological information) that can be drawn from each technique.
4. Analyze and interpret respiratory, cardiovascular and neuromuscular data (from Excel and figures) in order to comment about the underlying physiological mechanisms and/or methodological concerns pertaining to the technique(s).

Textbooks and Readings

This course does not have a required textbook. Instead, original research and review articles (both required and optional readings) will be posted to Canvas as the term progresses.

Assessments of Learning

As per HES UG Policy, to pass the course, you must pass both the lab and lecture components.

- Post-lab quizzes (*3 × 3%*; anticipated dates of Jan 27, Feb 10, and Mar 31) 9%
- Lab assignments (*4 × 4%*; anticipated due dates of Jan 23, Feb 27, Mar 6, and Mar 13) 16%
- Lab reports (*2 × 10%*; anticipated due dates of Feb 13 and Apr 3) 20%
- Group presentation (throughout the term) 20%
- Group presentation quizzes (throughout the term) 5%
- Final exam (sometime between April 13-24) 30%

LAB COMPONENT (45%)

- **Post-lab quizzes:** For three of the labs, a brief multiple-choice quiz will be given at the beginning of the next lecture. The quiz will be based on lab outcomes as well as material from the lab manual and the associated lecture. If a quiz will be missed due to unexpected event (e.g., illness), the HES Self Declaration Form must be completed. A known absence (e.g., a varsity sporting event) should be brought to my attention as soon as the student is aware of the conflict. If an absence is excused, the weighting of the quiz will be split between the other two quizzes. An unexcused absence will result in a grade of zero.
- **Lab assignments:** Assignments will involve performing data or statistical analysis, short answer questions related to data interpretation, and/or writing exercises. Answers are to be typed in Word using the same format as the lab reports (see next bullet), and any figures are to be prepared using Excel. Assignments are due one week* after the data are posted to Canvas.
- **Lab reports:** Reports are to be typed in 12-point font (Arial or Times Roman) with 1-inch margins and double spacing. Excluding the title page and references, the report is limited to a maximum of 8 pages. More details will be provided in the Introduction to the Lab Manual. Reports are due two weeks* after the data are posted to Canvas.

* Reading week could extend these deadlines by a week.

LECTURE COMPONENT (55%)

- **Group presentation:** In groups of 3-5 (dependent on class size), students will research an assigned topic to prepare and deliver a lecture of 20-30 minutes. The presentation will be followed by a question period. Groups will be formed by the random number generator function in Excel. Presentations will take place throughout the term. To ensure all groups have equal preparation time,

the topic will be assigned three weeks prior to the presentation (four weeks when Reading Week is involved). A student's grade will incorporate assessments by the other members of the group (i.e., peer evaluations) and me.

- **Group presentation quizzes:** At the end of each lecture with presentations, there will be a brief multiple-choice quiz based on the presented content.
- **Final exam:** The exam will be a combination of multiple-choice as well as short and long answer questions (including calculations and figures) based on material from throughout the term. The exam will take place during the exam period and, except for cases of an examination hardship / clash or academic concession, must be written at the scheduled time. Hence, wait until the exam schedule is posted before booking any travel.

Tentative Course Schedule *(subject to change)*

Week	Dates		Lecture	Lab #	Lab	Assessment
1	Jan 5-9	Tue	Introduction		**No labs**	
		Thu	**No lecture**			
2	Jan 12-16	Tue	Force and surface electromyography	1	Force and surface electromyography	*Assignment*
		Thu	Excel and PowerPoint tutorial			
3	Jan 19-23	Tue	Isokinetic and isotonic dynamometry	2	Isokinetic and isotonic dynamometry	*Quiz*
		Thu	**No lecture**			
4	Jan 26-30	Tue	**Post-lab quiz #1** / Intramuscular electromyography	3	Intramuscular electromyography	*Report*
		Thu	**No lecture**			
5	Feb 2-6	Tue	Ultrasonography	4	Ultrasonography	*Quiz*
		Thu	**No lecture**			
6	Feb 9-13	Tue	**Post-lab quiz #2** / Transcranial Doppler	5	Transcranial Doppler	*Assignment*
		Thu	Group presentations #1 and #2			
7	Feb 16-20	Tue	**No lectures or labs (Reading Week)**			
		Thu				
8	Feb 23-27	Tue	Electric vestibular stimulation	6	Electrical vestibular stimulation	*Assignment*
		Thu	**No lecture**			
9	Mar 2-6	Tue	**Post-lab quiz #3** / Transcutaneous electric stimulation	7	Transcutaneous electrical stimulation	*Assignment*
		Thu	Group presentations #3 and #4			
10	Mar 9-13	Tue	Group presentations #5 and #6		**No labs (SilverStar conference)**	
		Thu	**No lecture**			
11	Mar 16-20	Tue	Transcranial magnetic stimulation	8	Transcranial magnetic stimulation	*Report*
		Thu	Group presentations #7 and #8			
12	Mar 23-27	Tue	Sensory, motor, and cognitive function	9	Sensory, motor, and cognitive function	*Quiz*
		Thu	Group presentations #9 and #10			
13	Mar 30 - Apr 3	Tue	Group presentations #11 and #12		**No labs**	
		Thu	**No lecture**			
14	Apr 6-10	Tue	Review for final exam		**No labs**	
		Thu	**No lecture**			

Course Policies

Use of artificial intelligence

The use of generative AI tools, including ChatGPT and other similar tools, to complete any form of assessment in this course (e.g., lab reports) is not allowed and would be considered academic misconduct.

Late Submission Policy:

As the ability to meet deadlines is an essential life skill, this course has assessment deadlines that exist to support your learning and growth. However, I recognize that unforeseen circumstances may preclude your ability to meet a deadline. If such circumstances arise, consult the *Academic Concessions* section of the *HES UGC Policies* document on Canvas, send me an email, and, if appropriate, complete the online HES Self Declaration Form. Without an approved form or written permission from me, assignments received after the appointed time will be considered late and assessed the following penalties:

<1 hour: 10% deducted from grade
1-24 hours: 20% deducted from grade
24-48 hours: 50% deducted from grade
>48 hours: a grade of zero

Grade Appeal Policy:

- The TAs do the marking for the course. If you have a question/concern about the grade on an assignment or report, your first step is to contact the TA who marked your work to make an appointment. This step must be taken within one week of receiving the grade for an assignment or report, but the meeting can occur after this deadline. If the matter cannot be resolved with the TA, email me to make an appointment. Please note, if I regrade the assignment, it is possible that the grade can increase, decrease, or remain unchanged.
- The final grade of every student will reflect their actual performance during the term. That is, there will be no rounding of grades (e.g., from 49% to 50% or 79% to 80%). To hand out extra marks here and there or offer additional assignments to select students would be unfair to your classmates and, in the grand scheme of things, would undermine the degree that you are pursuing.

Missed Activity Policy:

Participation is critical during practical laboratory sessions, where you will work together to conduct experiments to promote learning as well as collect data that will be used for your assignments and reports. ***There is a 10% deduction from the cumulative lab component grade for each unexcused absence to a lab session***. If you are sick or have another unforeseen issue arise, please contact your TA and me as soon as possible so that other accommodations may be made.

Communication Policy:

If you do not understand a topic or concept, you are strongly encouraged to ask questions at the time material is presented during a lecture or lab. Should a question arise after the fact, please send an email to the appropriate person; i.e., your lab TA or me. Simple answers will be provided by email; however, if a question requires a lengthy answer or explanation, the TA or I will either recommend an in-person appointment or answer the question during the next lab/lecture. Emails sent during the week will be answered within 24 hours, whereas emails sent on Friday or Saturday will be answered on Monday. Given these response timelines, ensure you do not wait until the last minute to ask questions related to any course assessments.

Technology Use Policy:
When in class, phones must be put away and **muted**. Computers may only be used for course purposes during class time – non-course related computer use creates a distraction for all students in the vicinity. Students misusing electronics during class or lab time may be asked to leave.

Other Course Policies:

Final Examinations
You can find the Senate-approved term and examination dates here. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 27-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job.

Further information on Academic Concession can be found under Policies and Regulation in the Okanagan Academic Calendar.

Grading Practices
Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to University, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record.

Further information on Grading Practices can be found in the Okanagan Academic Calendar.

UBC Values
UBC creates an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada, and the world. UBC's core values are excellence, integrity, respect, academic freedom, and accountability.

About the Academic Integrity Matters (AIM) Program
AIM is a program that provides help and supports with academic integrity (AI) issues for undergraduate and graduate students. Please contact aim.ok@ubc.ca for any questions or for a 1-on-1 appointment with an AIM consultant.

Statement on Academic Misconduct
Academic integrity is integral to UBC as an institution of higher learning and research. Violations of academic integrity (i.e., academic misconduct) harm the academic enterprise; as a result, serious consequences arise and penalties may be imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred for consideration for academic discipline. Careful records are kept to monitor and prevent recurrences. Any instance of cheating or taking credit for someone else's work, whether intentionally or unintentionally, can and often will result in at minimum a grade of zero for the assignment, and these cases will be reported to the Head of the Department and Associate Dean Academic of the Faculty.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar.

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All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the Course Instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline.

Resources to Support Student Success:

Visit the Student Support and Resources page to find one-on-one help or explore resources to support your experience at UBC Okanagan, as well as many other campus services available to all students.

Disability Resource Centre

The Disability Resource Centre (DRC) facilitates disability-related accommodations and programming initiatives to that remove barriers for students with disabilities and/or ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course, please contact the DRC at:
UNC 215
Phone: 250.807.8053
Email: drc.questions@ubc.ca
Web: https://students.ok.ubc.ca/academic-success/disability-resources/

Equity and Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.
ADM 100B & 100C
Phone: 250.807.9291
Email: equity.ubco@ubc.ca
Web: https://equity.ok.ubc.ca/

Student Wellness

At UBC Okanagan, health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health, and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Student Wellness for more information or to book an appointment.
UNC 337
Phone: 250.807.9270
Email: healthwellness.okanagan@ubc.ca
Web: https://students.ok.ubc.ca/health-wellness/

Office of the Ombudperson

The Office of the Ombudsperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving. If you require assistance, please feel free to reach out for more information or to arrange an appointment.

UNC 217
Phone: 250.807.9818
Email: ombuds.office.ok@ubc.ca
Web: https://ombudsoffice.ubc.ca/

Student Learning Hub

The Student Learning Hub is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with academic integrity, study skills and learning strategies**. Students are encouraged to visit often and early to build the skills, strategies and behaviors that are essential to being a confident and independent learner. For more information, please visit the Hub's website.

LIB 237
Phone: 250.807.8491
Email: learning.hub@ubc.ca
Web: https://students.ok.ubc.ca/academic-success/learning-hub/

The Global Engagement Office

The Global Engagement Office provides advising and resources to assist International students in navigating immigration, health insurance, and settlement matters, as well as opportunities for intercultural learning, and resources for Go Global experiences available to all UBC Okanagan students, and more.

UNC 227
Email: ubco.global@ubc.ca
Web: https://students.ok.ubc.ca/about-the-avp-students-portfolio/directory/global-engagement-office/

Safewalk

Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at **250-807-8076**.
Web: https://operations.ok.ubc.ca/security-and-emergencies/safewalk/