Land Acknowledgement: I respectfully acknowledge that UBC Okanagan is located on the traditional, ancestral, and unceded territory of the Syilx Okanagan Nation. I am extremely grateful to have the privilege to live, work, and play on these lands. I am committed to working towards Truth and Reconciliation and encourage you all as UBCO students to reflect and learn more about historical and ongoing injustices faced by Indigenous people across Canada.

HES 305 (3) Exercise Physiology II

Duration: Term 1 Winter 2026
Delivery Modality: In-Person

Prerequisites: HMKN 200 or HES 105

Instructor: Dr. Hashim Islam, PhD
Faculty: Faculty of Health and Social Development
Department/School: Health and Exercise Sciences
Office hours: By appointment or designated times provided in-class
Office location: ART 154
Contact: Canvas (general) or email for emergencies and urgent issues (hashim.islam@ubc.ca)

Teaching Assistants:

Nicole Bushfield (nicolevb@student.ubc.ca)
Justin Monteleone (jmontele@student.ubc.ca)
Merete Rudolf (mereteru@student.ubc.ca)

Lecture Location: EME 050
Lecture Days and Time: Tuesday / Thursday 8:00 – 9:30 am

Lab location: UCH 110
Lab sections:

L01: WED 2 PM – 4 PM
L02: WED 4 PM – 6 PM
L03: WED 6 PM – 8 PM
L04: THU 10 AM – 12 PM
L05: THU 12 PM – 2 PM
L06: THU 2 PM – 4 PM
L07: THU 4 PM – 6 PM
L09: TUE 2 PM – 4 PM

Course Format

This course combines both lecture and laboratory investigation to achieve the learning objectives. The lectures will focus on the concepts and principles underpinning the study of exercise physiology. Laboratory activities specifically address the methodology of measurement and assessment of physiological systems during exercise and environmental stressors, and provide opportunities for applying and integrating course concepts. In addition, laboratory activities focus on clinical standards of measurement. Active participation for course activities including class discussions and contributions to laboratory sessions is encouraged, and will best support student learning.

Course Content

This course will cover how key physiological systems within the human respond to acute exercise and how these systems adapt to chronic exercise training. In the lecture component, students will gain an understanding of how the cardiorespiratory, metabolic, neuromuscular, and immune systems are controlled and coordinated to meet the demands of exercise. Key adaptations that occur following different types of exercise training or environmental stressors will also be covered. Students will learn to conceptualize exercise physiology using "key principles" that apply to many different physiological systems, providing them with an integrative understanding of exercise physiology. The laboratory component will provide hands-on experience measuring how the various physiological systems respond to exercise and environmental stressors, using key measurement techniques used in exercise physiology.

Learning Outcomes

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

1) Describe how human physiological systems (i.e., cardiorespiratory, metabolic, neuromuscular, immune) are controlled and how they respond to the demands of exercise and environmental stresses (e.g., heat, altitude).

2) Understand how multiple systems work in an integrative manner to maintain homeostasis during exercise and environmental stresses, and how these systems adapt over time.

3) Demonstrate understanding of physiological measurements during acute exercise and environmental stresses in a laboratory setting.

4) Conceptualize different physiological systems and how they respond to exercise and stress using "key principles"

5) Generate a data focused written report that addresses a hypothesis-driven research question based relevant scientific literature

Course Delivery

This course will be conducted in a predominantly in-person format. It is recommended that students attend all components of the course (and expected that students attend all laboratory sessions) in order to best support learning. Sessions will not be live-streamed. Some course activities will include pre-recorded videos or external resources, but instruction will be primarily in-person, unless extenuating circumstances warrant a modification.

- Course Lectures will be delivered in-person at the locations and times specified for this course. It is recommended to attend lecture to support student learning, unless illness or other extenuating circumstance precludes their attendance. If students are sick, we ask that they not to attend campus, per UBCO policy. Lectures will be recorded and uploaded to the course Canvas website; students may review sessions as needed. Students are encouraged to attend class whenever reasonably possible, to have questions answered and engage in collaborative, active learning in the in-person lecture format, which will support their understanding of course content. For any *asynchronous* material (pre-recorded and posted to Canvas the week of the lecture), students are expected to review the material and complete any associated activities (as a check for understanding) prior to participating in any *in-person* components of the lecture.

- Laboratory experiential learning sessions will be conducted in-person at the locations and times specified for each student's registered laboratory section. Attendance at students' specific registered lab time is required except in cases of illness or extenuating circumstances. If students are unable to attend their laboratory session, they must contact their course instructor and teaching assistant as soon as possible to either determine a suitable alternative, or be excused from the session (laboratory sessions will not be recorded). Laboratory sessions will involve practical laboratory experiences and experiments (designed to explore course topics using laboratory measurement and activities), as well as tutorial & application sessions (designed to use coordinated activities and student-guided exploration of topics to learn scientific communication and extend student learning).

Evaluation Criteria and Grading

Scientific Reporting Assignments (LOs 1-5) – 2 x 10% each = 20%

- Completed using data from the Lab Experiment sessions, and frameworks from the Scientific Reporting sessions
- Each assignment will explore elements of scientific reporting.
- These assignments will include creating appropriate research questions and ethical study conduct, analyzing study results and discussing experimental findings and critiquing research.
- Due at the start of your lab section during the weeks of **Oct 5th (Assignment #1)** and **Nov 16th (Assignment #2)**

Midterm (LOs 1-4) – 25%

- An individually-written assessment based on lecture and laboratory information, assessed via multiple choice, matching, true-false, fill-in-the-blank, and short answer questions, designed to support learning and understanding of lesson material throughout the course.
- The midterm must be completed individually, without discussion, collaboration or use of unauthorized resources/materials (more information will be available through the term).
- Held in-class during lecture on **Oct 27th 2026**

Final Laboratory Report (LOs 1-5) – 20%

- As a culminating assessment for the Laboratory Component, students will investigate a laboratory experiment performed through the term. Students develop a study question, create a hypothesis and rationale, describe the study methodology, collect and analyze experimental results and discuss the findings. Students will submit a complete scientific Lab Report. More details will be available regarding this project during the term.
- Due at the start of your lab section during the week of **Nov 30th 2026**

Final Exam (LOs 1-4) – 35%

- An individually-written assessment based on lecture and laboratory information, assessed via multiple choice, matching, true-false, fill-in-the-blank, and short answer questions, designed to support learning and understanding of lesson material throughout the course.
- It will cover all topics from the course (cumulative), including material not yet evaluated in other assessments.
- The Final Exam must be completed individually, without discussion, collaboration or use of unauthorized resources
- Held during the Final Exam Period (date TBD)

Note: Additional instructions and specific details on assessments will be provided in-class and/or labs, and posted on Canvas throughout the term

Required Readings and Videos

- Readings from relevant literature will be provided throughout the course for lecture and laboratory components. These will be posted to Canvas according to the class schedule.

Recommended Readings

- McArdle, W., Katch, F., & Katch, V. (2022). *Exercise physiology: Nutrition, energy, and human performance* (9th ed.). Wolters Kluwer Medical.
  - Online (eBook) or Hardcopy available; Editions 7th-9th acceptable
- Other recommended readings and recommended supplementary material will be posted through the term

Course schedule (topics and timelines subject to modification)

Week of Classes	Class #	Day	Date	Topic	Lab #	Lab Topic	Assessments
1	1	T	08-Sep-26	Introduction		*NO LAB*	
	2	Th	10-Sep-26	Key principles			
2	3	T	15-Sep-26	Metabolism overview	1	Intro, Screening, Baseline Data + SciReporting 1	
	4	Th	17-Sep-26	Anaerobic metabolism			
3	5	T	22-Sep-26	Aerobic metabolism - carbohydrates	2	Resting Metabolic Rate + Incremental Exercise Part 1 (MMC)	
	6	Th	24-Sep-26	Aerobic metabolism - fatty acids			
4	7	T	29-Sep-26	Metabolic regulation during exercise		*NO LAB- TRC*	
	8	Th	01-Oct-26	Fuel utilization during exercise			
5	9	T	06-Oct-26	Hormonal responses to exercise	3	Thresholds (Lactate & Ventilatory)	Assign #1
	10	Th	08-Oct-26	Skeletal muscle physiology			
6	11	T	13-Oct-26	Neuromuscular physiology I		*NO LAB- CSEP*	
	12	Th	15-Oct-26	Neuromuscular physiology II			
7	13	T	20-Oct-26	Cardiovascular Exercise Physiology I	4	SciReporting 2	
	14	Th	22-Oct-26	Cardiovascular Exercise Physiology II			
8	15	T	27-Oct-26	MIDTERM	5	EMG & Fatigue	Midterm
	16	Th	29-Oct-26	Respiratory Exercise Physiology I			
9	17	T	03-Nov-26	Respiratory Exercise Physiology II	6	Recovery from Max Exercise	
	18	Th	05-Nov-26	Exercise immonology I			
10		T	10-Nov-26	Reading Break - No Class		*NO LAB- Reading Break*	
		Th	12-Nov-26	REading Break - No Class			
11	19	T	17-Nov-26	Exercise immonology II	7	SciReporting 3	Assign #2
	20	Th	19-Nov-26	Integrative physiological responses to exercise			
12	21	T	24-Nov-26	Environmental physiology	8	Hypoxia	
	22	Th	26-Nov-26	Adaptations to aerobic training			
13	23	T	01-Dec-26	Adaptations to resistance training	9	REVIEW	Lab Report
	24	Th	03-Dec-26	***REVIEW***			
14	25	T	08-Dec-26	***TBD***		*NO LAB*	
			Dec 12-22	Exam Period			Final Exam

Learning Materials

All required and recommended readings, and other learning materials for this course will be available via Canvas.

Late Policy

Assignment deadlines are established to support your continued sequential and progressive learning. At the same time, we acknowledge that there are sometimes unforeseen circumstances that preclude our ability to meet those deadlines. Please inform your instructor of any late submissions, or to seek approval for an extension if needed; refer to the policies for the School of Health & Exercise Sciences (including Self-Declaration policy). With respect to these principles, the following policies apply to these evaluations:

- Assignments will be subject to a late penalty of 5% for the first 24 hours and 10% per day up to 7 days. Assignments submitted after 7 days will be given a grade of zero.

- Regrading of marked assignments will only be performed up to 10 days after an assessment has been marked, and after a reasonable course of action has been taken (e.g., reviewed the assignment rubric, discussed with the instructor, reflected on the answers, support for alternative marking) at which point another teaching member or third party will mark the assignment.

Missed Activity Policy

Throughout the term, students will be asked to participate as a community of learners, contributing to the ongoing evolution of course material, of peer learning, of interpersonal discourse and peer feedback. Class participation is especially valuable during practical laboratory sessions, where students will work together to conduct activities and experiments to promote learning. Therefore, full attendance and active participation in laboratory activities is required for course completion (exceptions may be granted for students with excused absences). A grade of Pass / Fail will be given for attendance and active participation (e.g., volunteering as a participant, leading measurements, contributing to group discussions, completion of lab activities, safe and professional conduct) in labs through the term. *There is a 10% deduction from the total lab mark for every unexcused absence to laboratory sessions.* If you are sick or have another unforeseen issue arise, please contact your TA and Instructor as soon as possible so that other accommodations may be made.

Missed Exam Policy

If students anticipate the need for rescheduling of a midterm ahead of time (for a reason outlined in the SHES polices), they must make a request to their instructor as early as possible (at least 2 weeks prior). If a midterm is *missed* for medical or other reasons outlined in the SHES policies, students must inform their instructor and request a new date for writing as soon as reasonably possible. The instructor will work with you to determine the best course of action. If you have missed an assessment, it is important that you do not discuss the missed exam with students who have written the exam, as this constitutes a form of Academic Misconduct. Please note, no re-writes (writing an assessment more than once) will be permitted and requests for moving of a midterm date may or may not be approved. Final exam is addressed below.

Use of AI Tools

The expectations for GenAI use in this course are designed to support your learning. Developing your own scientific reasoning (e.g., formulating research questions, interpreting data, and communicating findings in your own words) is central to the learning outcomes of this course. For this reason, the use of GenAI tools (e.g., ChatGPT) to complete or substantially generate any graded work, including the Scientific Reporting Assignments, Final Laboratory Report, Midterm, and Final Exam, is not permitted, as the learning comes from engaging directly in the process.

GenAI tools may be used for non-graded, formative purposes only, such as gathering general background information or brainstorming ideas outside of your submitted work. If you are unsure whether a particular use of GenAI is consistent with course expectations, please ask before submitting your work. Use of GenAI tools on any graded assignment or assessment will be treated as a form of academic misconduct.

Passing/Grading Criteria

You must pass **both the lab and lecture components of a course to receive a passing grade in this course. If you happen to fail one of these components, yet your total grade is still above 50%, then your final grade will be 49%. Individual assessments will have their own grading rubrics and criteria; please ensure you understand their policies through the term.

Additional UBC Policies & Resources

Academic Integrity

- The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are 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 to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.
- A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at the link below https://okanagan.calendar.ubc.ca/campus-wide-policies-and-regulations/student-conduct-and-discipline/discipline-academic-misconduct

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.

Other Resources to Support Student Success

UBC Okanagan Disability Resource Centre

The DRC facilitates disability-related accommodations and programming initiatives to remove barriers for students with disabilities and ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course, please contact the DRC at:

- Email: drc.questions@ubc.ca
- Web: www.students.ok.ubc.ca/drc

UBC Okanagan 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.

- Email: equity.ubco@ubc.ca
- Web: www.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.

- Email: healthwellness.okanagan@ubc.ca
- Web: www.students.ok.ubc.ca/health-wellness

Office of the Ombudsperson

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.

- Email: ombuds.office.ok@ubc.ca
- Web: www.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 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.

- Email: learning.hub@ubc.ca
- Web: www.students.ok.ubc.ca/slh

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.

- Email: ubco.global@ubc.ca
- Web: www.students.ok.ubc.ca/global-engagement-office/

Safewalk

Don't want to walk alone? Not too sure how to get somewhere on campus?

- Call at: **250-807-8076**
- Web: www.security.ok.ubc.ca