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 355 (3) Clinical Exercise Physiology Applications in Chronic Conditions: Endocrinology and Metabolic Disorders

Prerequisites: HES 351 and registration limited to students in the Clinical Exercise Physiology concentration of the B.H.E.S program.

Faculty: Faculty of Health and Social Development
Department/School: Health and Exercise Sciences
Instructor(s): Dr. Hashim Islam
Office hours: By appointment or designated times provided in-class
Office location: ART 154
Duration: Term 2 Winter 2025
Delivery Modality: In-Person
Course Location: ART 203
Course Days: Monday & Wednesday
Class Hours: 3:30 – 5:00 pm
Contact: Canvas (general) or email for emergencies and urgent issues (hashim.islam@ubc.ca)

Course Format

The course uses a lecture-based format to achieve the learning objectives, in conjunction with guided in-class group activities (e.g., case-based learning), a take home project, and closed-book examinations.

Course Overview, Content, and Objectives

This course will explore how the human body converts nutrients into usable energy (ATP) during daily life and in response to exercise and applies this knowledge to understand metabolism using practical examples in health, chronic disease, and human performance. Students will investigate the role of the endocrine and metabolic systems in the maintenance of health, as well as in disease, with special consideration of diabetes, metabolic syndrome and obesity, among others. Finally, students will investigate the effects of exercise in the regulation of metabolism and endocrine functions and explore the benefits, risks and opportunities for exercise prescription in the prevention, management and treatment of endocrine and metabolic disorders. The ***learning objectives*** are to:

- Facilitate an in-depth understanding of macronutrient metabolism and the regulation of metabolic processes and energy production during daily life and in response to exercise in relation to health and disease states.

- Guide students in understanding the fundamental role of key hormones in healthy living, exercise, and disease states.
- Support student learning of the guidelines, recommendations and evidence to support exercise in the prevention, management and treatment of endocrine and metabolic disorders and apply this understanding to design safe and effective exercise prescriptions for individuals living with these conditions.

Learning Outcomes

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

1) Describe key characteristics of metabolic disorders (e.g., diabetes, obesity, metabolic syndrome, fatty liver disease) – including etiology, prevalence, pathophysiological basis, common symptoms, comorbidities, and disease progression – and the associated impacts of exercise.

2) Demonstrate understanding of common disease-specific diagnostic tests, treatments and interventions, functional limitations, contraindications to exercise, and how each of these affect exercise prescription in this population.

3) Develop safe and effective clinical exercise assessment strategies, and evaluate, analyze and communicate relevant test results for key stakeholders.

4) Design a safe and effective exercise prescription, based on relevant assessments results, and describe an appropriate implementation of this prescription in individuals with, or at risk of metabolic disorders, including consideration of risks, equipment, environmental needs, emergency management and effective monitoring strategies.

5) Examine and critically appraise current guidelines for the treatment of metabolic disorders, and health and exercise research in the area.

Evaluation Criteria and Grading

Midterm 1 (LOs 1-3) – **15%**
- Combination of MCQs, short and long answer questions
- Held in-class on February 11th, 2026

Guided in-class group activities (LOs 2 & 3) – **15%**
- Case evaluations
- Research article critiques
- Written component to be submitted individually via Canvas by the end of the day on which the activity is held.

Midterm 2 (LOs 1-3*)* – **20%**
- Combination of MCQs, short and long answer questions
- Held in-class on March 23rd 2026

Midterm rewrites – **5% (2.5% each)**
- Open book and group-based format
- Opportunity to discuss questions and solutions with peers
- Held in-class on the lecture following each midterm

Exercise Prescription Project (LO 4) **20%**
- Design an exercise program to target a disease-specific metabolic defect
- Justification of exercise prescription based on consensus guidelines *and* underlying pathophysiology
- Completed individually and submitted via Canvas
- Due April 6th 2026 via Canvas

Final Examination (LOs 1-5) **25%**
- Combination of MCQs, short and long answer questions
- 2.5 hours in duration
- Held during final exam period (April 13th – 24th 2026, location TBD)

Recommended Readings

1. Frayn (2010). Metabolic Regulation: A Human Perspective. 3rd Ed. Wiley-Blackwell, Hoboken, NJ.
2. Ehrman et al. (2023). Clinical Exercise Physiology. 5th Ed. [*earlier editions accepted*]. Human Kinetics Publishing, Champaign, IL.
3. Journal articles posted throughout the course (see table on next page)

Course schedule (topics and timelines subject to modification)

Week	Lecture	Topic	Readings & resources	LOs
1	Jan 5	Introduction – course overview	-	-
	Jan 7	Key organs, tissues, and hormones	Frayn – Ch 5, 6	-
2	Jan 12	Insulin resistance as the root cause of metabolic diseases	Samuel & Shulman 2016. James et al. 2021 Podcast – Petter Attia The Drive #140. Gerald Shulman: A masterclass on insulin resistance	1
	Jan 14	Metabolic responses to acute exercise	Frayn – Ch 9 Thyfault et al. 2020 Hargreaves & Spriet. 2020	1
3	Jan 19	Tissue-specific metabolic adaptations to exercise training	Ashcroft et al. 2023 Thyfault et al. 2020	1
	Jan 21	T2D etiology, prevalence, pathophysiology, medications	Ehrman – Ch 8 Frayn – Ch 11	1, 2
4	Jan 26	T2D exercise testing, prescription, and considerations	Ehrman – Ch 8 Kanaley et al. 2022 Colberg et al. 2016	1, 2, 4
	Jan 28	**Guided in-class activity – exercise prescription in T2D**		3, 4
5	Feb 2	Obesity etiology, prevalence, pathophysiology, medications	Ehrman – Ch 9	1, 2
	Feb 4	Obesity exercise testing, prescription, and considerations	Ehrman – Ch 9 Jakicic et al. 2024	1, 2, 4
6	Feb 9	Midterm 1 review session		
	Feb 11	**MIDTERM 1 – IN-CLASS**		1-3
7	**Feb 16 – READING WEEK (NO CLASS)**			
	Feb 18 – READING WEEK (NO CLASS)			
8	Feb 23	MIDTERM 1 REWRITE – IN-CLASS (OPEN BOOK)		-
	Feb 25	MetS etiology, prevalence, pathophysiology, medications	Ehrman – Ch 12	1, 2
9	Mar 2	MetS exercise testing, prescription, and considerations	Ehrman – Ch 12 Myers et al. 2019	1, 2, 4
	Mar 4	**Guided in-class activity – exercise prescription in obesity and MetS**		3, 4

10	Mar 9	Liver disease etiology, prevalence, pathophysiology, medications	Keating et al. 2023	1, 2
	Mar 11	Liver disease exercise testing, prescription, and considerations	Stine et al. 2023	1, 2, 4
11	Mar 16	**Guided in-class activity – exercise prescription for liver disease**		3, 4
	Mar 18	Midterm 2 Review Session		
12	Mar 23	**MIDTERM #2 – IN CLASS**		1-3
	Mar 25	MIDTERM #2 REWRITE – IN-CLASS (OPEN BOOK)		-
13	Mar 30	Guest lecture - Nutritional considerations for metabolic disease	TBD	5
	Apr 1	Guest lecture – Emerging pharmacological therapies for metabolic disease	TBD	-
14	**Apr 6th – EASTER MONDAY (NO CLASS) – ASSIGNMENT DUE**			
	Apr 8	Final review session		
Apr 13th – 24th – FINAL EXAM DURING EXAM PERIOD				1-5

Late Policy

- A one-week no questions asked extension period is provided for the exercise prescription assignment (no need to notify the instructor if you will be submitting during this period).
- This extension period is to provide you with flexibility in completing the assignment while managing other coursework and/or in the event of unforeseen circumstances that prevent you from handing your assignment in on time.
- Assignments submitted after this period will not be graded (i.e., you will receive a grade of 0% for this component of the course)

Use of AI Tools

- AI tools such as ChatGPT can be used for formative work such as gathering information or brainstorming ideas
- You may not use AI on any graded assessment (i.e., your final assignment). The use of generative AI tools, including ChatGPT and other similar tools, to complete or support the completion of any form of assignment or assessment in this course is not allowed and would be considered academic misconduct.

Missed in-class activity Policy

- If extenuating circumstances require you to miss an in-class group activity, you will be required to complete this on your own (deadline determined by the instructor based on circumstances)
- Note that the case study and/or article you are provided may not be the same as what was provided in-class and you will miss the opportunity to work with your peers when completing the written portion.

Missed Exam Policy

- If you are ill or have another extenuating circumstance arise that permits you to miss the midterm or final exam a make-up exam will be arranged.
- Writing final exams early is not permitted unless under very exceptional circumstances and approved by the HES undergraduate curriculum committee.
- If you have missed a midterm or exam, 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.

Learning Materials

- You are required to read scientific journal articles pertaining to specific topics throughout the course, as outlined in the table above.
- Articles will be posted on Canvas ahead of time.
- You can expect to be tested on material within the journal articles if it pertains to concepts covered during in-class lectures.
- You do not need to memorize specific details and/or understand all aspects of these publications.

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 usually result in a failing grade or mark of zero on the assignment or in the course. Careful records are kept to monitor and prevent recidivism.
- A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar.

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