THE UNIVERSITY OF BRITISH COLUMBIA

**Land Acknowledgement**

UBC Okanagan is located on the traditional, ancestral, and unceded territory of the Syilx Okanagan Nation. I respectfully acknowledge that I am an uninvited visitor on these lands. As a student at UBC Okanagan, I encourage you to reflect on this and learn more about what we can do as we work towards Truth and Reconciliation.

**HES 380 – Exercise Metabolism**

**Faculty:** Faculty of Health and Social Development
**Department:** Health and Exercise Sciences
**Instructor(s):** Dr. Jonathan Little
**Instructor(s) Email:** jonathan.little@ubc.ca
**Duration:** Term 1 Winter 2026
**Delivery Modality:** In-Person
**Course Location:** ART 114
**Course Days:** Monday & Wednesday
**Class Hours:** 11:00am-12:30pm
**Office hours:** By appointment
**Teaching Assistants:** Roddie Sandilands roderick.sandilands@ubc.ca & Darci Gross darcig@student.ubc.ca

**Course Description**

The underlying metabolic events associated with exercise and nutritional challenges. Substrate delivery and skeletal muscle metabolism with respect to exercise. Formerly offered as HMKN 313. Credit will be granted for only one of HES 380 or HMKN 313. [3-0-0] Prerequisite: Either (a) HMKN 200 or (b) HES 105; and either (a) HES 200 or (b) HMKN 323.

**Course Overview**

The course format is a hybrid "flipped classroom" broken up into 5 X 2-wk modules. Each module follows the same consistent format with students responsible for watching 2-3 short (~25-30 minute) recorded lectures in the first week with creation of multiple-choice quiz questions related to the lectures submitted by the end of the week.

Students are expected to watch the recorded lectures and learn independently to become familiar with the material in the first week of each module. ***There is no formal class meeting on the Monday of the first week of each module but you should use this time to work independently to i) watch recorded lectures, ii) make a Discussion Board post, and iii) create two multiple choice questions for submission and grading.*** I will hold a "Chalk Talk" (in person) on Wednesday during the scheduled class time (11:00am – 12:20pm PDT) during the first week of each module. Key points, thought-provoking questions, and/or application scenarios will help guide these sessions so that you can apply the concepts from the recorded lectures. You can also ask questions about the material or seek additional assistance directly from the instructor. This means you should watch the recorded lectures prior to the Wednesday Chalk Talk. You are strongly encouraged to attend the Chalk Talk if you want to learn more, apply your

knowledge, clarify content, and get the most out of your university education. ***In the second week, students are expected to attend both the Monday and Wednesday in-person in-class sessions in ART 114***. Monday will be an integration session using practice questions and knowledge retrieval to help solidify main concepts from the module lectures and practice for exam-style questions. Wednesday will involve in-class activities and active learning approaches to work towards the application of knowledge. The Wednesday in-class activities will include a short Mini-Assignment or Reflection, which must be submitted by 11:59pm that day for grading. Quiz questions will be released on Wednesday at 12:20pm of the second week of each module, and the quiz can be completed within a 30-minute time at any point between Wednesday and 11:59pm on Sunday.

***Learning Outcomes or Objectives***

*Upon successful completion of this course, students will be able to…*

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| 1 | Identify key metabolic enzymes and describe how they function to regulate energy provision during exercise (Lectures, Student Quiz Content Creation, Chalk Talks, Integration Sessions, In-Class Activities) |
| 2 | Explain how the key components of carbohydrate and lipid metabolism are integrated during exercise, health, disease, and nutritional challenges (Lectures, Chalk Talks, Student Quiz Content Creation, Integration Sessions, In-Class Activities, Mini-Assignments) |
| 3 | Describe the major metabolic adaptations to exercise training and apply this knowledge to explain how exercise training: i) alters fuel selection during exercise; and ii) contributes to improved metabolic health (Lectures, Required Readings, Chalk Talks, Student Quiz Content Creation, Integration Sessions, In-Class Activities, Mini-Assignments) |
| 4 | Critically evaluate scientific research articles in the areas of exercise metabolism and nutritional supplements and be able to communicate your ideas in writing (Lectures, Chalk Talks, In-Class Activities, Mini-Assignments) |

**Methods of Assessment/Evaluation Components**

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| 1 | Canvas Discussion Board Posts 10% (2% each module) |
| 2 | Student Quiz Content Creation 16% (4% each module, Modules 1-4) |
| 3 | Module Quizzes 16% (4% each module, Modules 1-4) |
| 4 | Mini-Assignments & Reflections 10% (Top 4 of 5, 2.5% each) |
| 5 | Midterm Exam: Multiple choice and short-answer 20% (**Wednesday Nov 4th**) |

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| 6 | Final Exam: Multiple choice, short-answer, case study 28% (Date TBD) |

**Late Policy for Course**

The submission deadlines for this course are all considered **Firm Deadlines**. As such, there are no late submissions allowed for: i) Canvas Discussion Board Posting; ii) Multiple Choice Question Creation; iii) Module Quizzes. These assessments provide ample time and flexibility to be completed during the module on the student's own time – please plan accordingly. **I will give each student one "freebie" late assignment submission for these three assessment categories** due to personal circumstances, technical issues, competing interests, or forgetfulness – **if you require this accommodation, email me with your reason/excuse within 24 hours of the assignment due date and I will open it back up for you to submit in Canvas.**

There are a total of 5 Mini-Assignments/Reflections, which must be submitted by the 11:59pm deadline on the Wednesday of the second week of each module. Collectively, these assessments are worth 10% of your total grade. Your final grade will include your top 4 Writing Mini-Assignments/Reflections (i.e., I will drop your lowest grade and the top 4 grades will each contribute 2.5% to your final grade). **Mini-Assignments/Reflections are not part of the "freebie" late assignment submission category.** If you submit a Mini-Assignment/Reflection after the 11:59pm Wednesday deadline but within 24 hours of the due date it will be graded with a penalty of 30% taken off the given grade (i.e., a 72% grade on the assessment would be given a 42%). If you submit within 24-48 hours of the due date (i.e., between 11:59 Friday to 11:59 Saturday) it will be graded with a penalty of 50% taken off the given grade (i.e., a 72% grade on the assessment would be given a 22%). No submissions will be allowed after 48 hours unless under extenuating circumstances that are approved by School policies.

**Learning Materials**

You are required to read scientific journal articles pertaining to specific topics throughout the course, as outlined below. These articles will be posted on Canvas or you will need to search the literature on your own. You can expect to be tested on the main concepts in any articles posted on Canvas. When you read one of the required review articles, the objective is to introduce the topic and reinforce important points from the lectures. You will also have to search on your own, and interpret, primary journal articles for some In-Class Activities & Mini-Assignments. For this, the focus will be on the main findings and conclusions of the research study; you do not need to memorize specific details and/or understand all aspects of these publications. There are also two podcasts that you should listen to in Modules 4 and 5 (see links in Course Schedule below)

Link to Library Course Reserves for HES 380 *(CWL and login required, also available in Canvas):* https://courses.library.ubc.ca/c.2xvSvK

**Use of AI Tools**

The expectations for GenAI use in this course are designed to support your learning. All submitted written assignments and assessments (i.e., Discussion Board Posts, Multiple Choice Question Creation, Mini Assignments/Reflections) are designed for you to develop skills through your own practice and process. For these activities, **the use of GenAI tools to complete or substantially generate submitted work is not permitted because the learning comes from engaging directly in the process**.

Other uses of technology or learning supports may be appropriate where identified. For example, you may be encouraged to use GenAI tools (e.g., ChatGPT, Co-Pilot) to help summarize research articles during in-class writing assignments. If you are unsure whether a particular use of GenAI is consistent with course expectations, please ask before submitting your work. Learn more through the Generative AI website.

**Missed exam policy**

If you miss the midterm exam for legitimate reasons approved by School policies, you must write a make-up exam. Normally this must be completed within 1 week of when the original midterm was scheduled. *Please note that writing final exams early is not permitted unless under very exceptional circumstances and approved by the HES undergraduate curriculum committee.*

**Missed Activity Policy**:

On Wednesday during the second week of each module there will be an in-class activity that involves a Mini-Assignment or Reflection. These assignments are submitted via Canvas and are due by 11:59pm so if you miss class for extenuating circumstances (or choose not to attend) you should attempt to complete the assignment. You will not benefit from the In-Class Activity or discussion but you may still try to complete the Mini-Assignment or Reflection on your own time; this is why I have allowed for an 11:59pm submission deadline. If you miss one of these, you will not be allowed a make-up assignment unless under extenuating circumstances that are approved by School policies. The top 4 out of 5 grades for Mini-Assignments/Reflections are counted towards your final grade in the class, so you could miss one of these without penalty.

**Course Schedule**

| **Date** | **Meeting/Class** | **Tasks** | **Reading** |
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| Week 1-2 - **Introduction to the Course** | | | |
| Week 1<br>Wed. Sept. 9 | 11:00am-12:20pm – In-person Class<br>ART 114 | Review Course Outline & Canvas<br><br>Watch video: *Tips on writing good multiple choice questions* | Course Syllabus/Outline<br><br>"Socrative Instructions – HES 380" – posted on Canvas<br><br>"Explanation of Multiple Choice Question Creation and Submission" – posted on Canvas |
| Week 2<br>Mon. Sept 14<br><br><br><br><br><br><br><br><br>Wed. Sept 16 | 11:00am-12:20pm – In-person Class<br>ART 114<br><br>Example Integration Session & In-Class Activity – i) *How our brains learn & how can we use this information to study more effectively? ii) Review of Exercise Physiology & Metabolism*<br><br>11:00am-12:20pm – In-person Practice In-Class Activity<br>ART 114 | Wed. Sept 16<br>*Submit Practice Mini-Assignment/Reflection by 11:59pm<br><br>Sun. Sept 20<br>Complete Practice Quiz by 11:59pm | |

| Module 1 (Weeks 3-4) – **Overview of Metabolism, Bioenergetics & Enzymes** | | | |
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| Week 3<br>Mon. Sept 21 | No in-person class – watch pre-recorded lectures | Watch Lectures 1 & 2<br><br>*Make Discussion Board Post on Canvas | **Required Reading**:<br>Jeukendrup, 2012 |
| Wed. Sept 23 | 11:00am-12:20pm - In-person "Chalk Talk", open questions, or extra help<br>ART 114 | Sun. Sept 27:<br>*Submit 2 Multiple Choice Questions on Canvas by 11:59pm | |
| Week 4<br>Mon. Sept 28 | 3:30-4:50pm – In-person Integration Session<br>ART 114 | Wed. Sept 30:<br>Module 1 Quiz released on Canvas at 12:20pm | |
| Wed. Sept 30 | TRC day (no class) – In-Class Assignment Replaced by Online Assignment released on Tue Sept 29th and due on Thurs. Oct. 1 by 11:59pm (see Canvas for instructions, same format as Practice on Sept 16) | Thurs Oct 1:<br>*Submit Mini-Assignment/Reflection by 11:59pm<br><br>Sun. Oct 4:<br>*Complete Module 1 Quiz by 11:59pm | |

| Module 2 (Weeks 5-6) - **Carbohydrate Metabolism** | | | |
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| Week 5<br>Mon. Oct. 5<br><br>Wed. Oct. 7 | No in-person class – watch pre-recorded lectures<br><br>11:00am-12:20pm - In-person "Chalk Talk", open questions, or extra help<br>ART 114 | Watch Lectures 3 & 4<br><br>*Make Discussion Board Post on Canvas<br><br>*Sun. Oct. 11: Submit 2 Multiple Choice Questions on Canvas by 11:59pm | |
| Week 6<br>Mon. Oct 12<br><br>Wed. Oct 14 | No Class - Thanksgiving<br><br>11:00am-12:20pm – In-person Integration Session<br>ART 114 | Wed. Oct 14<br>Module 2 Quiz released on Canvas at 12:20pm<br><br>Wed. Oct 14<br>*Submit Mini-Assignment/Reflection by 11:59pm<br><br>Sun. Oct. 18<br>*Complete Module 2 Quiz by 11:59pm | |

| Module 3 (Weeks 7-8) – **Lipid Metabolism** | | | |
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| Week 7<br>Mon. Oct. 19<br><br>Wed. Oct 21 | No in-person class – watch pre-recorded lectures<br><br>11:00am-12:20pm: In-person "Chalk Talk" or extra help<br>ART 114 | Watch Lectures 5 & 6<br><br>*Make Discussion Board Post on Canvas<br><br>*Sun. Oct. 25: Submit 2 Multiple Choice Questions on Canvas by 11:59pm | |
| Week 8<br>Mon. Oct 26<br><br>Wed. Oct 28 | 11:00am-12:20pm – In-person Integration Session<br>ART 114<br><br>11:00am-12:20pm – In-person In-Class Activity<br>ART 114 | Wed. Oct. 28:<br>Module 3 Quiz released on Canvas at 12:20pm<br><br>*Wed. Oct 28:<br>Submit Mini-Assignment/Reflection by 11:59pm<br><br>*Sun. Nov. 1:<br>Complete Module 3 Quiz by 11:59pm | |
| Week 9 **– Midterm Exam Week** | | | |
| Week 9<br>Mon. Nov 2<br><br>Wed. Nov. 4 | 11:00am-12:20pm – In-person Midterm Review Session<br>ART 114<br><br>**11:00am-12:20pm - Midterm Exam In-Person**<br>ART 114 | *Wed. Nov 4<br>In-Person Midterm Exam<br>ART 114 | |

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| Reading Break (Week 10) – No class | | | |
| Module 4 (Weeks 11-12) – **Metabolic Adaptations to Exercise Training** | | | |
| Week 11<br>Mon. Nov 16<br><br><br>Wed. Nov 18 | No in-person class meetings – watch pre-recorded lectures<br><br>11:00am-12:20pm: In-person "Chalk Talk" or extra help<br>ART 114 | Watch Lectures 7 & 8 + bonus lecture<br><br>*Make Discussion Board Post on Canvas<br><br>*Sun. Nov. 22: Submit 2 Multiple Choice Questions on Canvas by 11:59pm | **Required Reading**:<br>Holloszy & Coyle, 1984<br><br>**Podcast** (will be used for In-person Activity on Nov. 25):<br>*The Real Science of Sport Podcast: Why everything you know about Zone 2 is probably wrong?* |
| Week 12<br>Mon. Nov 23<br><br><br><br>Wed. Nov 25 | 11:00am-12:20pm– In-person Integration Session<br>ART 114<br><br>11:00am-12:20pm – In-person In-Class Activity<br>ART 114 | Wed. Nov. 25:<br>Module 4 Quiz released on Canvas at 12:20pm<br><br>*Wed. Nov 25:<br>Submit Mini-Assignment/Reflection by 11:59pm<br><br>*Sun. Nov. 29<br>Submit Module 4 Quiz by 11:59pm | **Required Pre-Reading:**<br>Storoschuk et al. 2025<br><br>**Podcast** (will be used for In-person Activity on Nov. 25):<br>*The Real Science of Sport Podcast: Why everything you know about Zone 2 is probably wrong?* |

| Module 5 (Weeks 13-14) – **Insulin Resistance: Causes, Consequences, & Treatment** | | | |
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| Week 13<br>Mon. Nov 30<br><br>Wed. Dec 2 | No in-person class meetings – watch pre-recorded lectures<br><br>11:00am-12:20pm: In-person "Chalk Talk" or extra help<br>ART 114 | Watch Lectures 9, 10, & 11<br><br>*Sun. Dec 6<br>Make Discussion Board Post on Canvas<br><br>****NO SUBMISSION OF MULTIPLE CHOICE QUESTIONS OR QUIZ FOR MODULE 5** | **Required Reading:**<br>Bonen et al. 2006<br><br>**Recommended Podcast:**<br>Inside Exercise: *Fat metabolism, insulin resistance and exercise with Dr. Graham Holloway* (University of Guelph) |
| Week 14<br>Mon Dec 7<br><br>Wed. Dec 9 | 11:00am-12:20pm – In-person Integration Session<br>ART 114<br><br>11:00am-12:20pm– In-person In-class Activity<br>ART 114 | *Wed. Dec. 9<br>Submit Mini-Assignment/Reflection by 11:59pm | |
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| TBD | Final Exam Review | | |
| TBD | ***Final Exam (cumulative)** | | |

**UBC Policies & Resources**

**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.

**Policies and Regulations**

Visit UBC Okanagan's Academic Calendar for a list of campus-wide regulations and policies, as well as term dates and deadlines.

**About the Academic Integrity Matters (AIM) Program**

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 and the Academic Integrity Matters Program website.

**Statement on Academic Misconduct**

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

http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0.

**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.

***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: https://students.ok.ubc.ca/academic-success/disability-resources/

**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: 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: 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.

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: 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.

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? Not too sure how to get somewhere on campus?

Call Safewalk at **250-807-8076**.

Web: www.security.ok.ubc.ca