



## School of Health and Exercise Sciences HES 483: Environmental Physiology

**Land Acknowledgement:** I respectfully acknowledge that the University of British Columbia Okanagan resides on the traditional, ancestral, and unceded territories of the Syilx Okanagan Nation. I am deeply appreciative to live, learn, and recreate in Syilx Territory and aim to be a respectful steward of this beautiful land where I am an uninvited guest. I also acknowledge that I have directly benefitted from the historical, persistent, and systemic colonialization of Indigenous Peoples. As we learn together, I encourage you to reflect on the ongoing harms of colonization to Indigenous communities and how we may center Indigenous ways of knowing in our community.

**Instructor:** Dr. Madden Brewster, PhD

**Office:** Sessional instructor office (ART 127)

**Office hours:** TBD (based on class vote) + by appointment

**Online Meetings:** One-on-one Zoom meetings available by appointment

**Email:** [madden.brewster@ubc.ca](mailto:madden.brewster@ubc.ca)

**Class Time:** Wednesday and Friday: 12:30 to 14:00

**Room:** ART 202

### Academic Calendar Entry

Regulation and adaptation of the circulatory systems at rest, during exercise. Focus on adaptations and prescription implications following pathology [3-0-0] 3 Credits. (Formerly offered as HMKN 411. Credit will be granted for only one of HES 483 or HMKN 411)

**Prerequisites:** HMKN 310, HMKN 335, HMKN 205, HMKN 206

### Course Format

Each learning module includes a pre-reading from the required textbook (listed below) and an accompanying quiz. Quizzes are due on Canvas either on Tuesday or Thursday evenings by 11:59pm (see below for detail) each week. All materials, quizzes, assignments, exams, and due dates are also listed in the table below.

There are two midterm exams which are equally weighted. The final exam will cover the remainder of the course material, including peer presentations, and will also include cumulative materials from the entire course.

### Course Delivery

Students are required to access and review pre-readings each week in advance of class. There will be a weekly Canvas quiz to ensure preparation of the material before coming to class. The quiz will be graded for accuracy but is open book and due either Tuesday or Thursday by midnight (see table below for details). The scheduled in-person lecture time is on Wednesdays and Fridays, 12:30 – 14:00. Class format will include lectures with content related to the textbook pre-readings, including group activities and individual opportunities for practice. Laboratory demonstrations and guest lectures will occasionally be included. There will be two midterm exam covering material from quizzes, lectures, and readings. A final project will be given towards the last half of the term, there will be an in-class opportunity to work on the final project. There will also be a final exam at the end of the term with material from the final 1/3<sup>rd</sup> of the course and cumulative material throughout the term.



## Exam Format

Comprehension of course content will be assessed several times throughout the term by exams. Each exam will contain multiple choice questions and several essay questions to choose from. Materials from readings, lectures, and quizzes may be drawn from for exam content. Exam content will focus on the learning objectives from each module. Questions will test understanding of environmental physiology foundational knowledge as well as assess the application of learned content to new ideas and concepts.

## Course Overview, Content, and Objectives

This course is designed to analyze human physiological adaptations in response to extreme and diverse environmental conditions. Specifically, the problems of hypobaric hypoxia, hyperbaria, excessive heat, cold and humidity, high gravitational forces, microgravity, and pollution will be addressed. Case studies and popular examples will illustrate these topics whenever possible. Students will play an active role in their applied understanding of environmental physiology through independent investigation, readings, tutorials, and assignments.

## Learning Outcomes (LO)

After completing this course students should be able to:

1. Discuss and explain fundamental principles of environmental physiology
2. Use concepts of exercise physiology to explain acclimatization, adaptation and maladaptation to environmental stressors
3. Critically think and apply your understanding of fundamental principles of environmental physiology to novel and unique scenarios.

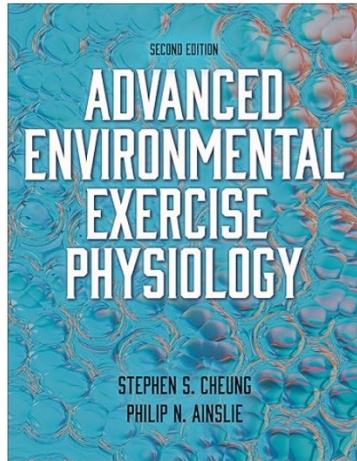
## Evaluation Criteria and Grading

i.	Quizzes	12%
ii.	Land Acknowledgement	3%
iii.	Exam #1	20%
iv.	Exam #2	20%
v.	Final Project	15%
vi.	Final Exam	30%

## Course Schedule, Required Readings and Videos

- Lecture notes from HK 200 / 310 / 410
- Relevant pre-readings will also be available prior to each lecture (see below for timing of these). **The course is designed around the following textbook, which is available electronically on the course Canvas:**

Cheung S and Ainslie PN. (2021). *Advanced Exercise and Environmental Physiology (2<sup>nd</sup> Edition)*. Human Kinetics.



Date	Topics	Pre-class reading(s) and quizzes <i>prior to class</i>	Additional Assignments	Learning Outcomes
<p><b>Week 1</b> Jan 8<sup>th</sup> and 10<sup>th</sup></p>	<p><b>Jan 8<sup>th</sup>:</b> Course Overview + Community agreement</p> <p><b>Jan 10<sup>th</sup>:</b> Foundations of temperature physiology + Cold Physiology</p>	<p><b>Chapter 1:</b> Fundamentals of Temperature Regulation (pg. 1-11)</p> <p><b>Chapter 5:</b> Cold Air Exposure (pg. 65-81)</p> <p><b>Due Jan 9<sup>th</sup> by 11:59pm:</b> Quiz #1: Foundations of temperature regulation + cold physiology I quiz</p>		<p><b>LO1</b></p>
<p><b>Week 2</b> Jan 15<sup>th</sup> and 17<sup>th</sup></p>	<p><b>Jan 15<sup>th</sup>:</b> Cold Physiology</p> <p><b>Jan 17<sup>th</sup>:</b> Cold Physiology</p>	<p><b>Chapter 6:</b> Cold Water Immersion (pg. 83-96)</p> <p><b>Due Jan 16<sup>th</sup> by 11:59pm:</b> Quiz #2: Cold Physiology II</p>	<p>Jan 15<sup>th</sup>: Land Acknowledgement Group #1</p> <p>Jan 17<sup>th</sup>: Land Acknowledgement Group #2</p>	<p><b>LO1, LO2</b></p>
<p><b>Week 3</b> Jan 22<sup>nd</sup> and 24<sup>th</sup></p>	<p><b>Jan 22<sup>nd</sup>:</b> Cold Physiology Demo</p> <p><b>Jan 24<sup>th</sup>:</b> Heat Physiology</p>	<p><b>Chapter 2:</b> Heat Stress (pg. 19-36)</p> <p><b>Due Jan 23<sup>rd</sup> by 11:59pm:</b> Quiz #3: Heat Physiology</p>	<p>Jan 24<sup>th</sup>: Land Acknowledgment Group #3</p>	<p><b>LO1, LO3</b></p>
<p><b>Week 4</b> Jan 29<sup>th</sup> and 31<sup>st</sup></p>	<p><b>Jan 29<sup>th</sup>:</b> Heat Physiology</p>	<p><b>Chapter 12:</b> Microgravity and Space Flight (pg.173-193)</p>	<p>Jan 29<sup>th</sup>: Land Acknowledgment Group #4</p>	<p><b>LO1, LO2</b></p>



	<b>Jan 31<sup>st</sup>:</b> Space Physiology	<b>Due Jan 30<sup>th</sup> by 11:59pm:</b> Quiz #4: Space Physiology  <b>Review for Exam #1!</b>	Jan 31 <sup>st</sup> : Land Acknowledgement Group #5	
<b>Week 5</b> Feb 5 <sup>th</sup> and 7 <sup>th</sup>	<b>Feb 5<sup>th</sup>:</b> Exam #1  <b>Feb 7<sup>th</sup>:</b> Hypoxia Physiology	<b>Chapter 10:</b> High Altitude Physiology (pg. 137-158)  <b>Due Feb 6<sup>th</sup> by 11:59pm:</b> Quiz #5: High Altitude Physiology I	Feb 7 <sup>th</sup> : Land Acknowledgment Group #6	<b>LO1, LO2, LO3</b>
<b>Week 6</b> Feb 12 <sup>th</sup> and 14 <sup>th</sup>	<b>Feb 12<sup>th</sup>:</b> Hypoxia Physiology  <b>Feb 14<sup>th</sup>:</b> Hypoxia Physiology – Demo	<b>Chapter 11:</b> High Altitude Training and Performance (pg. 159-172)  <b>Due. Feb 11<sup>th</sup> by 11:59 pm:</b> Quiz #6: High Altitude Physiology II	Feb 12 <sup>th</sup> : Land Acknowledgment Group #7	<b>LO1, LO2, LO3</b>
Feb 19 <sup>th</sup> and 21 <sup>th</sup>	Reading Week (Feb 20-24)	Semester/ Midterm Break	<b>Relax, spend time outside, enjoy time with friends + family, reset!</b>	
<b>Week 7</b> Feb 26 <sup>th</sup> and 28 <sup>th</sup>	<b>Feb 26<sup>th</sup>:</b> Hypoxia Physiology  <b>Feb 28<sup>th</sup>:</b> Breath-hold diving	<b>Chapter 7:</b> Breath-Hold Diving (pg. 97-107)  <b>Due Feb 27<sup>th</sup> by 11:59pm:</b> Quiz #7: Breath-hold diving	Feb 26 <sup>th</sup> : Land Acknowledgment Group #8  Feb 28 <sup>th</sup> : Land Acknowledgement Group #9	<b>LO1, LO2</b>
<b>Week 8</b> Mar 5 <sup>th</sup> and 7 <sup>th</sup> (UTAH)	<b>Mar 5<sup>th</sup>:</b> Breath-hold diving (Guest Lecture) – Dr. Alex Patrician  <b>Mar 7<sup>th</sup>:</b> Diving and hyperbaric physiology (Zoom)	<b>Chapter 8:</b> Diving and Hyperbaric Physiology (pg. 109-125)  <b>Due Mar 6<sup>th</sup> by 11:59pm:</b> Quiz #8: Diving and Hyperbaric Physiology	March 7 <sup>th</sup> : Land Acknowledgment Group #10	<b>LO1, LO2</b>
<b>Week 9</b> Mar 12 <sup>th</sup> and 14 <sup>th</sup>	<b>Mar 12<sup>th</sup>:</b> Review + Intro to final project  <b>Mar 14<sup>th</sup>:</b> Exam #2	<b>Review for Exam #2!</b>	<b>Review for Exam #2!</b>	<b>LO1, LO2, LO3</b>
<b>Week 10</b> Mar 19 <sup>th</sup> and 21 <sup>st</sup>	<b>Mar 19<sup>th</sup>:</b> Pollution physiology – General  <b>Mar 21<sup>st</sup>:</b> Pollution physiology – Wildfire	<b>Chapter 13:</b> Exercise in Polluted Environments (pg. 195-209)  <b>Due Mar 18<sup>th</sup> by 11:59pm:</b> Quiz #9: Pollution Physiology	Mar 19 <sup>th</sup> : Land Acknowledgment Group #11  Mar 21 <sup>st</sup> : Land Acknowledgment Group #12	<b>LO1, LO2</b>
<b>Week 11</b> Mar 26 <sup>th</sup> and 28 <sup>th</sup>	<b>Mar 26<sup>th</sup>:</b> Wildfire exposure: Guest	Guest lecture materials – Posted to Canvas	Mar 26 <sup>th</sup> : Land Acknowledgment	<b>LO1, LO3</b>



	Lecture – Occupational Hygienist: Drew Lichty  <b>Mar 28<sup>th</sup></b> : Final project work		Group #13  Mar 28 <sup>th</sup> : Land Acknowledgment Group #14	
<b>Week 12</b> Apr 1 <sup>st</sup> and 4 <sup>th</sup>	<b>April 1<sup>st</sup></b> : Final project present  <b>April 4<sup>th</sup></b> : Final project present	<b>Review for Final Exam!</b>	April 1 <sup>st</sup> : Land Acknowledgment Group #15  April 4 <sup>th</sup> : Land Acknowledgment Group #16  <b>Due April 4<sup>th</sup> by 11:59pm:</b> Individual portion of final project due	<b>LO3</b>

**Grading**

*Pre-class quizzes (12%)* – Weekly quizzes should be conducted after completing the pre-reading for a new learning module. Quizzes will be due prior to the beginning of a new learning module. Quizzes will be graded for accuracy. Other than the case of a documented, excusable reason (see below), no makeup quizzes or late quizzes will be accepted. The lowest quiz grade will be dropped.

*Land Acknowledgement Assignment (3%)* – Small groups will be responsible for giving one land acknowledgement throughout the term at the beginning of a class period. Student groups will sign up at the beginning of the term to do the acknowledgement at one lecture during the semester. The goal of this assignment is to understand the importance of a land acknowledgement in decolonization, practice the essential elements of a land acknowledgement, and uniquely adapt the acknowledgement to celebrate Indigeneity. A rubric will be provided at the date of assignment.

*Final Project (15%)* – A final project will be assigned to challenge you to expand your understanding and apply your knowledge of course material in new ways (LO3). Rubrics for the assignment will be provided at the time of assignment. No late work will be accepted without valid reason (see below).

*Midterm Exams (40%)* – Each exam will be worth 20% of your final grade. Each exams content will be based on the most recently learned material (e.g., it is not cumulative). Exams will be based on the learning objectives covered in class lectures, pre-readings, and any additional materials and assignments on Canvas. The exam will be multiple choice with several short essay questions to choose from.

*Final Exam (30%)* – The final exam will include material from the final topics covered after midterm Exam #2 as well as cumulative material from the overall course. Anything covered in lecture, pre-readings, quizzes, and student presentations may be included. The final exam will be structured like the midterm exams. More information on the final exam will be given at the end of the semester.



## Excused Absences

This class does not take attendance, however, attending class is highly encouraged in order to fully engage in the material, discuss, expand, and test your understanding of the course material. That being said, please don't come to class sick! In accordance with UBCO's policies, students are encouraged to remain at home when they are sick (flu-like symptoms) to prevent the spread of communicable disease. As per school policy, if a student is sick or will miss assignments or exams, they should make all efforts to submit a [Student Declaration of Absence Due to Illness or Injury](#) to the undergraduate coordinator (Dr. Gina Whitaker; [gina.whitaker@ubc.ca](mailto:gina.whitaker@ubc.ca)) as soon as possible. Students are responsible for making up material while absent and are expected to communicate should they need further accommodations for submitting work late (see policy below). The same process is expected for other common excusable reasons for missing assignments and exams such as: injury, death of a family member or friend, mental and chronic health needs, student athletic and academic competitions, and other reasonable requests. Bottom line: always communicate with me and we will get it sorted!

## Late Work Policy

Part of the learning experience involves managing your time effectively to avoid overload and balancing your academic and non-academic commitments as it is common to have several exams and/or assignments due on the same day or within the same week. As such, late work (assignments, quizzes, projects) will not be accepted unless extenuating circumstances arise, which are communicated with the professor and coordinated with the undergraduate coordinator (Dr. Gina Whitaker; [gina.whitaker@ubc.ca](mailto:gina.whitaker@ubc.ca)) as soon as possible. New due dates will be evaluated and agreed upon between instructor, the undergraduate coordinator, and student on a case-by-case basis. Once again, please just communicate with me so we can accommodate your needs!

## Missed exam policy

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

## Use of AI Tools

You are permitted to use AI tools for formative work such as gathering information or brainstorming BUT may not use it on any assessed work or in any final submission of an assignment. This means that the use of generative AI tools, including ChatGPT and other similar tools, to complete any form of assignment or assessment in this course is not allowed and would be considered academic misconduct.

## Accessibility

Our class will meet every Wednesday and Friday at 12:30pm in ART 202. The closest accessible parking to the Arts building is available in GYM Short Term lot (2-hours max). The accessible entries to the Arts building are indicated by arrows on the map below and are located adjacent to sġa?ġam tē spaġaġt (Research Road) as well as adjacent to the Central Courtyard (across from the Administration Building). The elevator for the Arts building is centrally located (see below) across from the Spoon Café on the first floor. The nearest accessible washrooms to ART 202 are located down the hall in ART 207W (women's), ART 205W (Men's) and ART 211W (gender neutral and family washroom). Lectures will be recorded so that you can watch these and/or



review Zoom transcripts below. Should you need to attend class from home, Zoom links will be provided.



### Instructor disclaimer

Please know that should you come to me with any concern, I will always take you seriously and follow up appropriately. If there are any accommodations I can facilitate, or something I can do to make learning more accessible for you, please do not hesitate to reach out.

## UBCO POLICIES AND 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 [Okanagan Academic Calendar](#).

### **Final Examinations**

The examination period for Term 2 of Winter 2024/25 session is April 14<sup>th</sup> to 29<sup>th</sup> inclusive. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 24-hour period) or unforeseen events, students will be permitted to apply for our-of-time final examinations only if they are representing the University, the province or the country in a competition or performance; serving 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 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 the faculty, department, or school might change an unofficial grade given by an instructor. Grades are not official until they appear on a student's academic record. See [here](#) for more information.

## **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:

**UNC 214**      250.807.9263

**Email:** [drc.questions@ubc.ca](mailto:drc.questions@ubc.ca)

**Web:** [www.students.ok.ubc.ca/drc](http://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.

**UNC 216**      **250.807.9291**  
email: [equity.ubco@ubc.ca](mailto:equity.ubco@ubc.ca)  
Web: [www.equity.ok.ubc.ca](http://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.

**UNC 337**      **250.807.9270**  
email: [healthwellness.okanagan@ubc.ca](mailto:healthwellness.okanagan@ubc.ca)  
Web: [www.students.ok.ubc.ca/health-wellness](http://www.students.ok.ubc.ca/health-wellness)

### **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.**

**LIB 237**      **250.807.9185**  
Email: [learning.hub@ubc.ca](mailto:learning.hub@ubc.ca)  
Web: [www.students.ok.ubc.ca/slh](http://www.students.ok.ubc.ca/slh)

### **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**      **250.807.9818**  
Email: [ombuds.office.ok@ubc.ca](mailto:ombuds.office.ok@ubc.ca)  
Web: [www.ombudsoffice.ubc.ca](http://www.ombudsoffice.ubc.ca)

### **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](http://www.security.ok.ubc.ca)

**Not sure where to go for help?**

Try the [FHSD's Navigation Tool](#) for resources:

