

FACULTY OF HEALTH

SCHOOL OF KINESIOLOGY AND HEALTH SCIENCE

Course: [HH/KINE 4443 3.0](#) - Living and Performing at high altitude: The physiology of human adaptation to environmental hypoxia

Course Webpage: eClass (login with your passport YorkU)

Term: **WINTER 2024**

Prerequisite / Co-requisite: KINE 2011, KINE 3012

By enrolling in KINE 4443 you have the responsibility to carefully read the present course outline.

Acknowledgement of Indigenous Peoples and Traditional Territories: “York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region”.

KINE 4443 - QUICKFACTS

| | |
|---|---|
| In-person lectures on campus? | ✓ |
| Lecture audio recordings (eClass)? | ✓ |
| Lecture video recordings (eClass)? | ✗ |
| Evaluation (see pages 5-6 for details) | |
| 3 In-class tests (25.5%, 30.5%, 19%). Total: 75% | ✓ |
| 2 Online multiple-choice quizzes (10%, 10%). Total: 20% | ✓ |
| 1 Online reflective activity (5%). Total:5%. | ✓ |
| Final exam in the final examination period? | ✗ |

Course Director **Dr. Olivier BIROT**, Associate Professor, PhD
School of Kinesiology and Health Science
Faculty profile: <https://health.yorku.ca/health-profiles/index.php?dept=&mid=700794>

CONTACTING THE COURSE DIRECTOR

You should contact the course director **by email at birot@yorku.ca**.

Your email **must** indicate **(1) your last name, (2) your first name, and (3) your student number as it appears on the class list**. "Unidentified" email or email not fulfilling (1), (2), and (3) will **not** be answered.

Office hours

Office hours should be requested by email. Office hours are conducted online via **Zoom** and are **recorded**.

Course Description

KINE 4443 will provides an in-depth analysis of the human physiological responses to altitude hypoxia including the acclimatization of the lowlander visiting altitude to the genetic adaptation of populations living at high altitude. These responses are analyzed from the perspective of integrative physiology as well as cellular and molecular mechanisms. Addresses the impact of hypoxia on human performance within the context of exercising at high altitude and using hypoxia to improve sea-level performance.

Expanded Course Description

This course will explore some of the main physiological mechanisms adopted by the human body for surviving and exercising at high altitude. We will discuss how environmental stressors (for example altitude or thermal stress exposure) can challenge the body homeostasis and potentially impair exercise performance and eventually lead to injury or death without appropriate physiological adaptive responses.

Students will be exposed to the key concepts of human physiology including the cardiorespiratory system, thermoregulation, muscle physiology, neuroendocrinology. Integrative physiology responses as well as in-depth cellular and molecular mechanisms will be discussed.

The exact content and order of the material covered in class can be modified by the course director.

Examples of topics covered:

1. Altitude and altitude hypoxia (from physics laws to WHO data on populations), history of altitude physiology and medicine.
2. Human adaptation to acute altitude hypoxia exposure. The main physiological responses of the lowlander acutely exposed to altitude hypoxia.
3. Human adaptation to prolonged (chronic) altitude hypoxia exposure. The main physiological responses of the lowlander exposed chronically to altitude hypoxia.
4. Additional environmental stressors present during altitude hypoxia (cold, wind, solar radiations)
5. Genetic adaptation to altitude hypoxia and high altitude populations (Tibetans vs. Andeans).
6. Altitude hypoxia and sport performance. Climbing the Mount Everest (history, physiological aspects). Altitude training as a strategy to improve sea-level performance. International recommendations and strategies for exercising at altitude.
7. Age and sex-specific considerations: Children, women, the elderly and altitude hypoxia.
8. Altitude hypoxia exposure and clinical populations (diabetes, asthma, heart disease).
9. Acute mountain sickness (AMS).
10. AMS complications: HACE and HAPE.

Course Learning Objectives and Outcomes

Course Learning Objectives

1. Introduce the student to the scientific knowledge of human adaptation to altitude hypoxia with a translational approach from integrative physiology concepts to in-depth cellular and molecular mechanisms.
2. Promote the development of critical thinking skills related to the field of altitude physiology.
3. Expose the student to the skill of reading and critically appraising the relevant scientific literature.
4. Expose students to the practice of communication in the context of altitude physiology with sharing their knowledge with diverse audiences.

Course Learning Outcomes

Upon successful completion of this course students will be able to:

1. Explain key physiology and biology concepts, from integrative physiology to cellular and molecular biology, relating to the human adaptation to altitude hypoxia.
2. Critically analyze and discuss results from the scientific literature relating to the field of altitude physiology.

3. Demonstrate communication skills in order to share their knowledge. In particular, they will be able to describe and explain the mechanisms of human adaptation to altitude hypoxia to various audiences, from scientists to general public (knowledge translation).
4. Evaluate the characteristics of an altitude exposure situation (environmental context, population involved) in order to make recommendations for an optimal adaptation (health, performance, acclimation, identification of risks/pathologies).

Course Organization

1. Lectures: days, time, and location

KINE 4443 will be delivered **in-person** on the **Keele campus at York University** unless special circumstances (weather conditions, illness in the teaching team. In that case, an online recording could be provided to keep up with the course timing).

- Tuesdays, 2:30PM - 4:00PM, CLH 110

- Thursdays, 2:30PM - 4:00PM, HNE B17

2. Course material

The course material tested during the different course evaluations is the material **delivered in class**. This is an **in-person course**, and it is the student's responsibility to attend to the lectures. The eClass slides represent **an aid to the course only**, and do not reflect all the testable material. Some in-class slides have additional information. Any additional information, verbal or written/drawn is also considered as part of the testable material.

3. Audio and video recordings

The teaching team will do its best to provide an audio-recording of the lectures on eClass, but this is not guaranteed. Students are welcome to do their own audio-recording. Videorecording is **not** permitted.

Course Evaluation

1. General and important information

- The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York
- A graded feedback worth **at least 15% of the final grade** will be received by students prior to the final withdrawal date (drop deadline) from a course without receiving a grade. **See the Registrar website (or calendar in the present document) for dates.**
- Students enrolled in KINE 4443 should be familiar with the **YorkU Code of Student Rights & Responsibilities** (<https://oscr.students.yorku.ca/csrr>). Any request for individual "grade bump" is considered inappropriate.

2. Alternate Exam Center and test accommodation

Students with accommodation **must arrange their own booking** with the alternate examination center. The course director cannot provide any accommodation during regular in-class tests.

Question: I have accommodation, but I did not book a room on time for my test. Can I still write in the regular room?

Answer: Yes, but understand there will be no accommodation provided since we administer the in-class test at the regular scheduled class time and might not be able to expand beyond due to room occupancy. You can also try to arrange for another date/time with the alternate center. It is your decision and responsibility.

3. KINE 4443 Evaluation

Evaluation in KINE 4443 has **6 components**: 3 in-class tests, 2 online quizzes, and 1 reflective activity.

3.1. In-class tests (75%)

3.2. Online reflective activity (5%)

3.3. Online multiple-choice quizzes (20%)

3.1. In-class tests (75%)

These in-class tests consist of **booklet exams** that could combine short-answer questions, multiple choice questions, graphs and figures interpretation/drawing. Tests are **60 to 75 minutes long** and are scheduled during regular class time. Refer to the calendar at the end of the course outline. Tests are **cumulative**.

TEST-1 Thursday **FEB. 01**.
Duration: **60-75 minutes** (will be indicated later in class).
Weight (% of the final grade): **25.5%**

TEST-2 Thursday **MAR. 07**
Duration: **60-75 minutes** (will be indicated later in class).
Weight (% of the final grade): **30.5%**

TEST-3 Thursday **MAR. 28**
Duration: **60-75 minutes** (will be indicated later in class).
Weight (% of the final grade): **19%**

3.2. Online reflective activity (5%)

This assignment should be **submitted on eClass no later than APR. 04 by 11:00PM** (see calendar). **It can be submitted earlier. There is no extension.** The reflective activity is very subjective and personal. It gives students the opportunity to step back and to reflect on the course they have completed.

Students will have to address the following questions:

Q1. What was(were) the most valuable part(s) or topic(s) of the course? Why?

Q2. What was(were) the least valuable part(s) or topic(s) of the course? Why?

Q3. What would you change, remove, or add in this course and why?

Q4. Do you think that what you have learnt in the course (material, skills, etc.) could be useful in the future in your professional or personal environment? How/why?

Q5. Would you say that the course met, exceed, or did not meet your initial expectation? Why?

The format of the document is **PDF only** (no Word). Minimum: **200 words**. Maximum: **500 words**. Proper academic performance depends on students doing their work not only well, but on time. **Late submission will be penalized (1% out of the 5%).**

3.3. Online multiple-choice quizzes (20%)

2 online multiple-choice quizzes x 10% each = 20% of the final grade.

QUIZ 1 (10%). Will open **Tuesday JAN 30. at 8AM** and will close at **11PM**.

QUIZ 2 (10%). Will open **Tuesday MAR. 05 at 8AM** and will close at **11PM**.

Students with time accommodation are responsible to contact the teaching team to ensure that their quiz duration has been adjusted accordingly. **Note that an official accommodation letter from York University is required.**

| Tuesday | | Thursday | |
|----------------|------------------------------|----------------|---|
| JAN. 09 | Lecture 1 | JAN. 11 | Lecture 2 |
| JAN. 16 | Lecture 3 | JAN. 18 | Lecture 4 |
| JAN. 23 | Lecture 5 | JAN. 25 | Lecture 6 |
| JAN. 30 | Online QUIZ-1 (10%) | FEB. 01 | TEST-1 (25.5%) |
| FEB. 06 | Lecture 7 | FEB. 08 | Lecture 8 |
| FEB. 13 | Lecture 9 | FEB. 15 | Lecture 10 |
| FEB. 20 | Winter Reading week | FEB. 22 | Winter Reading week |
| FEB. 27 | Lecture 11 | FEB. 29 | Lecture 12 |
| MAR. 05 | QUIZ-2 (10%) | MAR. 07 | TEST-2 (30.5%) |
| MAR.11 | Monday: DROP DEADLINE | | |
| MAR. 12 | Lecture 13 | MAR. 14 | Lecture 14 |
| MAR. 19 | Lecture 15 | MAR. 21 | Lecture 16 |
| MAR. 26 | Lecture 17 | MAR. 28 | TEST-3 (19%) |
| APR. 02 | DEFERRED | APR. 04 | <i>BACK-UP DEFERRED</i> Deadline Reflective activity (5%) |

Missed in-class tests or online quizzes.

- **I missed an in-class test: What should I do?**

There is no documentation required for missing a scheduled test (whatever is the reason, illness, religious observance, travel, etc.). **However, you MUST email the course director within a week after the missed test to request an approval for writing the deferred test.** **Not contacting the course director within a week would result in receiving 0% at the in-class test.**

Once your email received, your eligibility to write the **DEFERRED TEST on APR 02** will be confirmed by the course director. The deferred test is the same cumulative test for all students. What differs is the weight of the test (% of the final grade) that will reflect what you have missed.

IMPORTANT!! You cannot miss more than two tests. If you miss all three in-class tests on their original scheduled dates, you will **not** be eligible to write the deferred test and you will receive a **F final grade in the course**. You will have to submit a formal petition to the Faculty of Health.

- **I have accommodation but I missed an in-class test because there was no room available for me to write at the alternate exam center: What should I do?**

You have all the test dates well in advance (in this document). It is your responsibility to book your rooms as early as possible. Still, there might be room availability issue. **In that case, you can write at a different date and time based on the alternate examination center availability.**

- **What happen if the deferred APR 02 or 04 sessions are cancelled due to an unforeseen event (weather condition with university closure for example)?** Unfortunately, that is not the teaching team's responsibility. Another deferred session will be scheduled in **May-June 2024** (as it is the case in many other courses on campus).

- **IMPORTANT!! There is no "deferred-deferred test":** Missing the deferred test will result in 0% to the test, and further extensions or accommodation will require students to submit a formal petition to the Faculty of Health.

FREQUENTLY ASKED QUESTION

Q1. Is there any required textbook?

No.

Q2. Is there an online version the course?

This is an **in-person course** delivered on Keele campus. However, audio recordings of the lectures will be available on eClass.

Q3. Is class attendance monitored?

No. It is the student's responsibility to attend to classes, and for the best chances of success in the course students are strongly encouraged to attend to classes. Only enrolled students can attend to classes.

Q4. Why do slides posted on eClass and presented in class differ?

Slides posted on eClass represent a support tool for students. They do not reflect the entire course content presented in class on "Lecture slides" (additional material on slides, additional slides, etc.).

Q5. Are slides always posted on eClass before class?

Not necessarily, it might be shortly after the lecture.

Q6. What is the grading system used in the course?

A+ (90-100%), A (80-89%), B+ (75-79%), B (70-74%), C+ (65-69%), C (60-64%), D+ (55-59%), D (50-54%), E (marginally below 50%), F (below 50%).

Q7. My grade is borderline between two letter grades. For example, I have a final grade of 79.45%. Can I ask the course director to round it to an A (80%)?

No. The course director enters each grade component (tests, reflective activity, presentation) directly into an **Excel template provided by the Kinesiology and Health Science undergraduate office**. It is the Excel formula that will **automatically** "round the final grade" and determine the letter grade. Usually, in the given example, a grade ≤ 79.50 would be a B+ and a grade ≥ 79.51 would be an A. **Students are also strongly encouraged to read the YorkU Code of Student Rights & Responsibilities** (<https://oscr.students.yorku.ca/csrr>).

Course policies and procedures

Copyright Information

The course material used is the intellectual property of the instructors unless otherwise stated. **Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this material for distribution (e.g., uploading material to a commercial third-party website) may lead to a violation of Copyright law.** The buying and selling of any course material (including lecture slides, evaluation items, etc.) may constitute an infringement of intellectual property rights and/or a breach of Academic Honesty.

Zero-tolerance policy regarding Breach of Academic Honesty

Refer to the *York University Senate Policy on Academic Honesty* and *York University Code of Students Rights & and Responsibilities* for more information.

Course modifications

In the event of unpredictable situations (COVID-19, weather, etc.), the Course Director can decide to re-adjust the course organization (lectures, format, evaluation, dates, etc.). The number of lectures assigned to Parts I and II could also be revised accordingly to the progression of the course.