

**KINESIOLOGY/BIOLOGY 3010**  
**Physiology of Exercise**  
**Fall 2026**



**Lakehead**  
UNIVERSITY

School of  
Kinesiology

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**TIMES:**

Lecture Times:

|        |             |         |
|--------|-------------|---------|
| Monday | 2:30 – 5:30 | BB 2006 |
|--------|-------------|---------|

Lab/Tutorial Times:

|                 |               |         |
|-----------------|---------------|---------|
| F6 Tuesday      | 4:30 – 6:30   | SB 1025 |
| or F5 Wednesday | 8:30 – 10:30  | SB 1025 |
| or F2 Wednesday | 10:30 – 12:30 | SB 1025 |
| or F3 Thursday  | 4:30 – 6:30   | SB 1025 |

**CALENDAR DESCRIPTION:**

A study of principles of physiology as they apply to human movement. Topics discussed include training principles, energy metabolism, characteristics of skeletal muscle, neurological aspects of human movement, muscle contraction and fatigue, respiration, and circulation. Laboratory sessions expose students to the techniques used in measuring the energy systems.

Pre-requisite(s)/Co-requisite(s): You must have successfully completed CHEM 1210, BIOL 2011, 2012, and 2030 to take the course. You must register for KINE 3010L (lab) at the same time as KINE 3010 (lecture). Both sections are to be taken in the same term.

**COURSE FORMAT:**

Each week will consist of one, 3-hour classroom session, and one 2-hour lab session. Throughout the classroom sessions there will be Interactive PowerPoint lectures, online activities, in-person demonstrations, quizzes, and group activities/discussion. Lab sessions will be comprised of hands-on experiments, activities, demonstrations, work sheets, and formal lab reporting.

**LEARNER OUTCOMES:**

At the conclusion of this course, students will be able to:

1. Explain, with numerous examples, how the body maintains homeostasis during both acute and chronic exercise.
2. Discuss and differentiate the biochemical pathways involved in aerobic and anaerobic energy production.

3. Explain how exercise intensity and duration affect fuel selection, with an ability to apply this understanding to various exercise contexts.
4. Illustrate the biochemical and physiological adaptations which occur in the human body to meet the acute and chronic demands of different types of exercise and work.
5. Identify the site of release, stimulus for release and predominant action of various hormones, particularly in the context of exercise and training
6. Internalize the general organization of the nervous system and how we control movement
7. Connect the chain of events that occur during muscular contraction
8. Provide an overview of the design and function of the respiratory and circulatory systems
9. Synthesize, connect, and integrate the physiological concepts discussed in this course to explain various acute and chronic responses to exercise

#### EVALUATION:

| <u>Item</u>                  | <u>Weighting</u> | <u>Due Date</u>                   |
|------------------------------|------------------|-----------------------------------|
| <b>"Class" Component</b>     |                  |                                   |
| 1. Quizzes (Indiv. + Group)  | 20% (1% each)    | Weekly in class                   |
| 2. Graphical Abstract        | 10%              | Dec 8th                           |
| 3. Reflection                | 5%               | Fall break - Nov 10 <sup>th</sup> |
| <b>Class Component Total</b> | <b>35%</b>       |                                   |
| <b>"Lab" Component</b>       |                  |                                   |
| 4. Lab Activities            | 10%              |                                   |
| 5. Lab Report 1              | 15%              |                                   |
| <i>Intro</i>                 | 2%               | <i>Week of Sept 29</i>            |
| <i>Methods</i>               | 2%               | <i>Week of Oct 19</i>             |
| <i>Results</i>               | 2%               | <i>Week of Oct 26</i>             |
| <i>Discussion</i>            | 3%               | <i>Week of Nov 3</i>              |
| <i>Full Submission</i>       | 6%               | <i>Week of Nov 17</i>             |
| 6. Lab Report 2              | 10%              | Week of Dec 1                     |
| <b>Lab Component Total</b>   | <b>35%</b>       |                                   |
| 7. <b>Final Exam</b>         | <b>25%</b>       | TBD - Exam Period                 |
| 8. <b>"Flex"</b>             | <b>5%</b>        | Oct 12 <sup>th</sup>              |

### **Quizzes** (Learner Outcomes 1-8)

At the start of each class, there will be a short, 5 - 10 question multiple choice quiz (~10 minutes) based on the previous week's class/topic. You will first complete this quiz individually using **pen and paper**. You will then get to discuss and rewrite the quiz in small, assigned groups via D2L. The individual and group quiz marks will contribute equally to your final mark. For the group quiz, wrong answers will be returned on submission – you will get to resubmit answers until correct. Your group quiz mark will then be derived from the “average of attempts” (i.e., the fewer attempts, the better). Note that quizzes will also be used as a tool to evaluate attendance. Missed quizzes will be assigned a “0” unless an alternate quiz time can be arranged with the GAs, at their and the Instructor's discretion.

### **Graphical Abstract** (Learner Outcomes 4-9)

Throughout the course, you will be presented numerous, graphs, figures, and illustrations to visualize concepts and physiological processes. Your job will be to create a figure, or “graphical abstract” that demonstrates both a high and low-level overview of the entirety of course content as applied to an exercise modality of your choice. Furthermore, you may be asked to “talk to” or “walk” others through your figure. Further assignment details will be provided in D2L as the course progresses.

### **Reflection** (Learner Outcome 9)

Some background reading on this is provided under “reflective learning” on our D2L site. For this assignment, I would like you to critically reflect on how you have performed in the course so far (i.e., individual and group quizzes, lab report components). My hope is that in doing this you will appreciate that critical inquiry into why you perform the way you do. Other objectives of the assignment are that it may improve your metacognitive abilities (i.e., your ability to analyse how you learn) which may lead to lessons learned on how best to prepare for subsequent exams or evaluations. A final objective of this assignment is that it will allow me to find out what is and what is not working as I deliver and refine the course.

As this is just a 5% assignment, my expectations are for a **one-page, single spaced** typed submission. You should note that I (Zach) will be the only one marking these assignments and information will be kept in confidence unless otherwise discussed.

### **Lab Activities** (Learner Outcomes 1-4, 6, 7 9)

Each lab will have an associated activity (i.e., worksheet) on D2L that you will be, under most circumstances, expected to complete during class time.

### **Lab Reports** (Learner Outcomes 1 - 3, 4, 7, 9)

You will submit 2 lab reports over the length of the course, based on specific lab activities. The first lab report will be “scaffolded,” in that it will be completed in stages on a weekly basis (i.e., intro, methods, results, discussion – see evaluations), and returned to you with feedback. The second lab report will take a standard APA format and submitted in its entirety near the end of the semester, once you have received feedback from your first lab report.

### **Final Exam** (Learner outcomes 1-9)

The final exam will occur during the Final Exam Period and will be cumulative. Exam format and question types will include, but are not limited to multiple choice, true/false, short answer, matching, and fill in the blank.

## “Flex”

To support individual learning styles and assessment strengths, you will have the option to apply a 5% weight increase to either the “*lab component*,” or “*final exam*.” Note that this does not “add” 5% to your final mark but rather weighs the components higher when calculating your final grade. For example, the class component is, by default, worth 35% of your mark. If you choose to weight the lab component 5% higher, it will be worth 40%.

From a math perspective, say you achieved a composite score of 30/35(%) for the lab component – that is an 86% (A). When calculating your final mark, your class component would therefore be calculated as  $40(\%) \times 0.86 = 34.4$ .

While you have the autonomy to choose where you would like to allocate this 5%, the purpose of it is to support your success and learning, not to function as a fall-back or insurance policy. As such, you will be required to submit your **binding** choice by October 12<sup>th</sup>.

If you do not submit your choice, the 5% will be added to the Final Exam by default.

## LATE POLICY

Students will incur a 20%-mark reduction starting **immediately** after the assignment due date/time. Students may submit work/assignments up to 1-week past the listed submission time without further penalty. After 1-week, the work will not be evaluated without a bonified medical, personal, or athletic reason.

Note that, for Lab Report 1, a component of your mark will be dependent on your ability to address comments from the previous submission – if you do not submit on the due date, there is no guarantee that you will received feedback in time, which will negatively affect your performance on subsequent submissions.

*If you anticipate any issues meeting assignment due dates, you are encouraged to reach out to your GA or Instructor as soon as possible so that alternate arrangements may be discussed.*

## REQUIRED TEXT AND RESOURCES:

Powers, S. K., Howley, E. T. & Quindry J. (2026). *Exercise physiology: Theory and application to fitness and performance* (Evergreen/2026 International Release). New York, NY: McGraw-Hill Education. (\$119.95 CAD; Required)

Lakehead Kinesiology T-shirt (Recommended; link to be updated when available from bookstore))

Lakehead Shirt - <https://bookstore.lakeheadu.ca/Catalogue/shop/clothing/tees/corporate-logo> (\$24.99)

## **LABORATORIES:**

Students are expected to engage in physical activity and exercise during the labs, and to the best of their ability. If you cannot, or are uncomfortable participating (e.g., injury, illness, dysmenorrhea), please let one of your GAs know as soon as possible.

Attendance is expected (and required) at all scheduled labs. If a lab is missed without a bona fide medical, personal, or athletic reason, a 3% reduction (applied to your final grade in the course) will be enforced. If you have had more than two unexcused absences, you will be required to retake the course.

Students should come to lab dressed and prepared to engage in physical activity and/or moderate exercise during the labs. Specifically, a “Lakehead Kinesiology” or “Lakehead” branded top is expected to be worn for labs. Choice of pants and/or shorts are at the discretion of the student. Exceptions will be made and respected for any religious or medical clothing.

## **ADDITIONAL COURSE INFORMATION:**

The School of Kinesiology has adopted a series of policies that apply to all courses. Students are expected to be familiar with these policies and to abide by them. The program policy document may be found on the School of Kinesiology website at:

<https://www.lakeheadu.ca/programs/departments/kinesiology/current-students/regulations-and-policies>

## **Supports for Students**

There are many resources available to support students. These include but are not limited to:

- [Health and Wellness](#)
- [Student Success Centre](#)
- [Student Accessibility Centre](#)
- [Library](#)
- [Lakehead International](#)
- [Indigenous Initiatives](#)

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact [Student Accessibility Services](#) (SC0003, 343-8047 or [sas@lakeheadu.ca](mailto:sas@lakeheadu.ca))

Courses offered by the School of Kinesiology address a number of the College of Kinesiologists of Ontario's entry-to-practice competencies. For more information on the competencies and becoming a registered Kinesiologist, visit the CKO website at <https://coko.ca>.

**Policy and Resource Statements:** <https://www.lakeheadu.ca/teaching-commons/pedagogy-toolkit/preparing-your-course/Policy-resource-statements-to-prepare-your-course>

## **Artificial Intelligence and the Student Code of Conduct - Academic Integrity**

Inappropriate usage of Generative AI tools is captured by Section III of the Student Code of Conduct - Academic Integrity Policy, which lists a variety of acts that are considered offences under the Academic Integrity Code. While not an exhaustive list, submission of work created by or in collaboration with Generative AI tools (ChatGPT, Bard, etc.) could be categorized as Plagiarism (para 26a), Use of Unauthorized Materials (para 26b), or Falsification (para 26e), and may be in conflict with the Academic Policy quoted above.

GenAI tools can provide valuable assistance and support in academic work. However, it is essential to use them responsibly and ethically. The following information and guidelines apply to the use of AI-based tools in this course:

**a. Student Responsibility** - It is the responsibility of the student to understand the limitations of AI-based tools. While these tools can provide suggestions and insights, final decisions and critical thinking should come from the student's own understanding and effort. Before submitting, review your work with this in mind. If you don't understand what type of GenAI usage is appropriate, ask the course instructor for clarification.

**b. Formative Usage - In this class, you may use GenAI for formative, but not summative, work.** That means it can be used as a "possibility engine" (brainstorm tool), a "study buddy," a "collaboration coach," a "guide on the side," a "personal tutor," a "co-designer," etc. to help you learn course content, but it cannot be used as the primary vehicle for any work that is submitted for marks or evaluation. (See UNESCO's "[ChatGPT and Artificial Intelligence in Higher Education Quick Start Guide](#)," page 9, for explanations and examples of these and other roles GenAI can productively serve in a formative capacity.)

**c. Error & Bias** - AI content is created by computer algorithms that have been trained using large amounts of data. The AI learns from patterns and examples in the data to generate new content that resembles what it has been trained on. If the training data used to train the AI model is biased or limited in scope, the AI may reproduce content that is inaccurate, incomplete, offensive, and/or biased. Students should weigh this as they consider material produced by AI.

**d. Trustworthiness** - Generative AI can be vulnerable to manipulation and misuse. It can be used to generate fake news, misinformation, or deepfake content, which can have harmful consequences. Students should check AI generated content against reputable sources.

**e. Plagiarism** - Since [writing and critical thinking ability] are learning outcomes of this course, all work submitted for evaluation must be the student's original work. Using the work of others (including content curated/generated by AI) without proper citation is considered plagiarism. See "[Citing Artificial Intelligence](#)" for assistance with correct documentation.

**f. Citation of Sources** - If you use material generated by an AI program for an assignment in this course, it must be cited like any other source (with due consideration for the quality of the source, which may be judged as poor). Failure to do so will be considered a violation of academic integrity. See [Student Code of Conduct – Academic Integrity](#).

## Class Schedule - Overview

| #  | Week of          | Class    | Lab      | Quiz     | Notes                                     | Notes                                                                      |
|----|------------------|----------|----------|----------|-------------------------------------------|----------------------------------------------------------------------------|
| 0  | Sept 7/26        | X        | X        | NO       | Labour Day                                | No class/lab                                                               |
| 1  | Sept 14/26       | ✓        | ✓        | NO       | First class/lab                           |                                                                            |
| 2  | Sept 21/26       | ✓        | ✓        | YES      |                                           |                                                                            |
| 3  | Sept 28/26       | ✓        | X        | YES      | National Day for Truth and Reconciliation | Lab Report Intro due (Sunday, 11:59pm)                                     |
| 4  | Oct 5/26         | ✓        | ✓        | YES      |                                           | <ul style="list-style-type: none"> <li>Course Reflection Opened</li> </ul> |
|    | <b>Oct 12/26</b> | <b>X</b> | <b>X</b> | <b>X</b> | <b>TG/Fall Break</b>                      |                                                                            |
| 5  | Oct 19/26        | ✓        | ✓        | NO       |                                           | Lab Report Methods (due in lab)                                            |
| 6  | Oct 26/26        | ✓        | ✓        | YES      |                                           | Lab Report Results (due in lab)                                            |
| 7  | Nov 3/26         | ✓        | ✓        | YES      |                                           | Lab Report Discussion (due in lab)                                         |
| 8  | Nov 10/26        | ✓        | X        | YES      | Remembrance Day                           | Course Reflection Closed (11:59pm)                                         |
| 9  | Nov 17/26        | ✓        | ✓        | YES      |                                           | Lab Report 1 – full package (due in lab)                                   |
| 10 | Nov 24/26        | ✓        | ✓        | YES      |                                           |                                                                            |
| 11 | Dec 1/26         | ✓        | ✓        | YES      |                                           | Lab Report 2 (due in lab)                                                  |
| 12 | Dec 7/26         | ✓        | X        | YES      |                                           | Graphical Abstract (Due Dec 8th, 11:59)                                    |

## Topic Overview

Note: Timeline and topics are estimates and subject to change.

| Week    | Topic – Class                                             | Topic - Lab                                                      | Textbook Chapter |
|---------|-----------------------------------------------------------|------------------------------------------------------------------|------------------|
| Week 1  | Intro/ Measurement/Graphs/Control of Internal Environment | Intro, Safety, Measurement, Wearables                            | Chapter 1, 2     |
| Week 2  | Bioenergetics                                             | Aerobic (submaximal) and Anaerobic (maximal) Exercise Metabolism | Chapter 3        |
| Week 3  | Exercise Metabolism + Endocrine System                    | n/a                                                              | Chapter 4        |
| Week 4  | Exercise, Hormones, and the Immune system                 | Muscle power, post-activation potentiation                       | Chapter 5, 6     |
| Week 5  | Nervous System                                            | Orthostatic Stress + BP Response to Exercise                     | Chapter 7        |
| Week 6  | Muscle Structure + Function                               | RT/Muscle Fatigue                                                | Chapter 8        |
| Week 7  | Physiology of Resistance Training                         | ECG - Exercise Response                                          | Chapter 14       |
| Week 8  | Exercise and the Circulatory System                       | n/a                                                              | Chapter 9        |
| Week 9  | Exercise and the Circulatory/Respiratory System           | VO <sub>2</sub> Max                                              | Chapter 9, 10    |
| Week 10 | Respiration During Exercise                               | Spirometry                                                       | Chapter 10       |
| Week 11 | Physiology of Aerobic + Anaerobic Training                | VO <sub>2</sub> /BMR/Wingate                                     | Chapter 13       |
| Week 12 | Review + abstracts                                        |                                                                  |                  |