

Western University  
Faculty of Health Sciences  
**School of Kinesiology**

**KIN 2230B - Introductory Exercise Physiology  
Winter 2022**

<b>Instructor</b>	Daniel Keir	<b>Lectures</b>	Asynchronous (2/week)			
<b>Office</b>	AHB3G18	<b>Classroom</b>	N/A			
<b>Email</b>	dkeir@uwo.ca	<b>Delivery Type</b>	Online			
<b>Phone</b>	519-661-2111 (ext. 87962)					
<b>Office Hours</b>	by appointment					
<b>Lab Instructor</b>	Michael Herbert	<b>Laboratory Delivery</b>	1 every 2 weeks TBA			
<b>Office</b>	AHB3G04					
<b>Email</b>	mherber5@uwo.ca					
<b>Phone</b>	519-661-2111 (ext. 88675)					
<b>Office Hours</b>	TBA					
<b>TAs</b>	Randy Keltz (rkeltz@uwo.ca)		<b>Section</b>	<b>Day</b>	<b>Time</b>	
	Laura Parkinson (lparkin@uwo.ca)				<b>Room</b>	
	N. Behboodpour (nbehboo@uwo.ca)		002 & 003	Mon	4:30 – 6:30 pm	TH3103
	Nasimi Guluzade (nguluzad@uwo.ca)		004 & 005	Mon	4:30 – 6:30 pm	TH3103
	Joshua Huggard (jhuggard@uwo.ca)		006 & 007	Wed	1:30 – 3:30 pm	TH3103
			008 & 009	Wed	1:30 – 3:30 pm	TH3103
			010 & 011	Wed	7:00 – 9:00 pm	TH3103
			012 & 013	Wed	7:00 – 9:00 pm	TH3103
			014 & 015	Fri	2:30 – 4:30 pm	TH3103
			016 & 017	Fri	2:30 – 4:30 pm	TH3103

**NOTE:** All course information including grades, assignment outlines, deadlines, etc. are available via OWL. Check the website regularly for course announcements.

**Calendar Course Description (including prerequisites/anti-requisites):**

The physiological basis of muscular exercise and training. The course will examine metabolic, cardiorespiratory and muscular adaptations to acute and chronic exercise.

**Prerequisite(s):** Grade 12U Biology or equivalent, and [Physiology 1021](#) or equivalent with a minimum grade of 60%.

**Extra Information:** 3 lecture hours, 3 laboratory hours biweekly.

*You are responsible for ensuring that you have successfully completed all course pre-requisites, and that you have not taken an anti-requisite course.*

*Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.*

**NOTE:** If you wish to enroll in this course without the stated pre-requisite(s), you must obtain written approval from the course instructor. The approval should then be forwarded to your academic counsellor.

## 1. Course Description

Dynamic exercise imposes a *demand* for energy that is proportional to both the force and rate at which the muscle contracts. To match energy *supply* to energy *demand*, the body relies on coordinated adjustments of the neural, respiratory, cardiovascular, and muscle metabolic systems. Each of these systems is amenable to adaptation through chronic exercise (training) or disease (deconditioning) and it is the capacity and cooperation of these physiological systems that determine performance. This course will examine in detail this “energy demand versus energy supply” relationship with specific reference to how energy supply is maintained (or not) at various demands (intensities and durations).

## 2. Learning Outcomes

By the end of the course, students should be able to:

1. Demonstrate a working knowledge of: a) how energy is stored and utilized in muscle; and b) how the metabolic systems match energy supply to exercise energy demand.
2. Describe in detail the physiological systems connecting the atmosphere to the muscle mitochondria and their independent and integrative roles in oxygen supply and carbon dioxide removal during exercise.
3. Describe how breathing and blood flow are regulated with changes in exercise demand and how both may be challenged during near-maximal exercise.
4. Define exercise intensity based on “intensity domains” and describe/identify the unique physiological response profiles of and implications for exercise within each intensity domain.
5. List the common anatomical and functional adaptations to exercise training and explain specifically how they improve exercise performance or capacity.
6. Collect, analyze, and interpret exercise test data, correctly evaluate aerobic fitness, (e.g., maximal oxygen uptake, gas exchange threshold, critical power) and recognize normal intensity-dependent response profiles (blood lactate and gas exchange responses).

## 3. Schedule

### 3.1 Lecture

Two, ~70 minute lectures will be posted weekly on OWL. Content and specific weeks may change.

Lecture Week	Lecture Topic
1	Introduction to exercise physiology
1	Skeletal muscle and human movement I
2	Skeletal muscle and human movement II
2	Bioenergetics and muscle metabolism – in the cytosol
3	Bioenergetics and muscle metabolism – in the mitochondria
3	Bioenergetics of muscle metabolism – substrate utilization
4	Energy – expenditure and measurement
4	Integrative exercise metabolism
5	Hormonal control during exercise
5	<b>REVIEW FOR MIDTERM</b>
6	<b>MIDTERM</b> (Date TBA)
6	Pulmonary ventilation and gas diffusion
7	<b>READING WEEK</b> (Feb 19-27)
8	Gas exchange and transport within blood
8	The heart and circulation - systemic

9	The heart and circulation - peripheral
9	Diffusive oxygen transport in muscle
10	Venous return and pulmonary circulation
11	What limits $VO_2$ max?
11	Physiological adaptations to exercise training – part I
12	Physiological adaptations to exercise training – part II
12	<b>REVIEW FOR LAB EXAM</b>
13	Control of breathing and the cardiovascular systems during exercise
13	<b>LAB EXAM (Date TBA)</b>
	<b>REVIEW FOR FINAL EXAM</b>

### 3.2. Lab

Each lab runs for 2 weeks. You attend one lab every two weeks. Lab section numbers correspond to whether it is scheduled in week one or two: Week 1 sections 2, 4, 6, 8, 10, 12, 14, & 16 (even numbers), Week 2 sections 1, 3, 5, 7, 9, 11, 13, 15, & 17 (odd numbers). All sections in Week 1 are classified as “Group 1” and all sections in week 2 are classified as “Group 2”.

Appropriate dress (gym wear) is required for all labs. Please come to each lab prepared to exercise. Data collected in your lab will be needed to complete each of the lab assignments.

Labs begin the week of January 31<sup>st</sup> (tentative).

Lab	Date	Lab Topic
1	Group 1: TBA Group 2: TBA	Introduction to measuring gas exchange
2	Group 1: TBA Group 2: TBA	Maximal oxygen uptake and incremental exercise testing
3	Group 1: TBA Group 2: TBA	Critical power
4	Group 1: TBA Group 2: TBA	Ventilatory response to exhaustive exercise

#### Notes:

1. All lecture materials will be posted on OWL.
2. We will attempt to cover all material as indicated above but it is possible that we might not complete all listed material, that additional material may be added, or the order of lectures will be reorganized.
3. Attendance of lectures is highly recommended. For most lectures, slides will be the primary source of material, but additional material will be included.
4. Laboratory sections have been determined well in advance. Legitimate excuses for missing or re-scheduling labs include illness, compassionate circumstances, etc. Extended vacations, extra work, etc. do not qualify.
5. Exam periods have been selected to conflict as little as possible with other scheduled classes. Please report any potential conflicts **NOW**, do not wait until the week before the exam.

#### 4. Required Course Material/Text:

All required readings will be posted on OWL.

## 5. Course Evaluation Plan:

Grades are a measure of the performance of a student in individual courses. Each student shall be judged on the basis of how well they have command of the course materials.

Component	Category	Value
I	Lab Tutorial Quizzes	2%
II	Lab Assignments	18%
III	Midterm Exam	31%
IV	Lab Exam	18%
V	Final Exam	31%

### Evaluation Plan Breakdown:

Component I	Description	Value	Due Date
Lab 1 Tutorial Quiz	Short multiple-choice quiz on OWL	0.5%	TBA
Lab 2 Tutorial Quiz	Short multiple-choice quiz on OWL	0.5%	TBA
Lab 3 Tutorial Quiz	Short multiple-choice quiz on OWL	0.5%	TBA
Lab 4 Tutorial Quiz	Short multiple-choice quiz on OWL	0.5%	TBA
Component II	Description	Value	Due Date
Lab Assignment #1	Analysis and interpretation of data collected in Lab 1	4.5%	TBA
Lab Assignment #2	Analysis and interpretation of data collected in Lab 2	4.5%	TBA
Lab Assignment #3	Analysis and interpretation of data collected in Lab 3	4.5%	TBA
Lab Assignment #4	Analysis and interpretation of data collected in Lab 4	4.5%	TBA
Component III	Description	Value	Due Date
Midterm Exam	Covers all lecture and lab material from 1 <sup>st</sup> day of class to midterm data <ul style="list-style-type: none"> <li>○ online, time TBA</li> <li>○ Multiple choice</li> </ul>	31%	TBA
Component IV	Description	Value	Due Date
Laboratory Exam	Covers material from all labs and will involve analysis and interpretation of exercise responses. <ul style="list-style-type: none"> <li>○ online, time TBA</li> <li>○ Analysis of exercise data and short answer</li> </ul>	18%	TBA
Component III	Description	Value	Due Date
Final Exam	Cumulative, covers all lecture and lab material from the entire course <ul style="list-style-type: none"> <li>○ online, time TBA</li> <li>○ Multiple choice</li> </ul>	31%	TBA

Due dates for assignments will be announced in Week 4. All tutorial quizzes and lab assignments will be completed and submitted through OWL. Assignments will not be accepted late, except under medical or other compassionate circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. A missed mid-term or laboratory examination, without appropriate documentation will result in a zero (0) grade. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents, illness, or death) or similar circumstances.

### 5.1 Missed Exams

In situations in which students miss an exam for legitimate reasons, there will not be an opportunity to write the exam at a later date. Rather, the value of the exam will be added to the final. For example, if a student misses the midterm (31%), their final exam will be worth 62% (31% + 31%).

## **COVID-19 Related Policies and Guidelines**

### **Masking Guidelines**

- Students will be expected to wear triple layer, non-medical, paper masks at all times in the classroom as per University policy and public health directives. Students who are unable to wear a mask must seek formal accommodation through Western Accessible Education, and present medical documentation.
- Students are not permitted to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks.
- Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Dean, and such actions will be considered a violation of the student Code of Conduct.

### **Course Absences due to Daily COVID Screening Questionnaire**

- Missed assessments (e.g., presentations, essays, quizzes, tests, midterms, etc.) require formal academic considerations (typically self-reported absences and/or academic counselling). Methods for dealing with missed work and course content are at the discretion of the instructor(s). Students should be aware that some learning outcomes cannot be easily made up and may need to be completed in a subsequent year. Your instructor will provide you with further information as to how this applies within this course.
- Students who demonstrate a pattern of routinely missing coursework due to self-reported COVID symptoms, and therefore do not demonstrate mastery of the learning outcomes of the course, will not receive credit for the course.

### **Contingency plan for an in-person class pivoting to 100% online learning**

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor. In the event that online learning is required, a stable internet connection with working microphone and webcam will be required. As has been the case in the past, the decision to pivot to online learning will be made by Western, and not individual instructors or departments (excepting temporary online instruction in the event of instructor illness).

## Statement of Online Etiquette

Some components of this course will involve online interactions. To ensure the best experience for both you and your classmates, please honour the following rules of etiquette:

- please “arrive” to class on time
- please use your computer and/or laptop if possible (as opposed to a cell phone or tablet)
- ensure that you are in a private location to protect the confidentiality of discussions in the event that a class discussion deals with sensitive or personal material
- to minimize background noise, kindly mute your microphone for the entire class until you are invited to speak, unless directed otherwise
- please be prepared to turn your video camera off at the instructor’s request if the internet connection becomes unstable
- unless invited by your instructor, do **not** share your screen in the meeting

The course instructor will act as moderator for the class and will deal with any questions from participants. To participate please consider the following:

- if you wish to speak, use the “chat” function and wait for the instructor to acknowledge you before beginning your comment or question
- remember to unmute your microphone and turn on your video camera before speaking
- self-identify when speaking.
- remember to mute your mic and turn off your video camera after speaking (unless directed otherwise)

General considerations of “netiquette”:

- Keep in mind the different cultural and linguistic backgrounds of the students in the course.
- Be courteous toward the instructor, your colleagues, and authors whose work you are discussing.
- Be respectful of the diversity of viewpoints that you will encounter in the class and in your readings. The exchange of diverse ideas and opinions is part of the scholarly environment. “Flaming” is never appropriate.
- Be professional and scholarly in all online postings. Cite the ideas of others appropriately.

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

## Course/University Policies

### 1. Academic Offences:

They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com <http://www.turnitin.com>

Computer marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

### 2. Electronic Device Usage:

**During Lectures and Tutorials:** Although you are welcome to use a computer during lectures and tutorial periods, you are expected to use the computer for scholastic purposes only, and refrain from engaging in any activities that may distract other students from learning. Please be respectful to your fellow students and turn the sound off. If the professor receives complaints from other students regarding noise or other disruptive behavior (e.g. watching videos on YouTube.com, updating your Facebook status, playing Solitaire), your classroom privileges will be revoked. From time to time, your professor may ask the class to turn off all computers, to facilitate learning or discussion of the material presented in a particular class. Unless explicitly noted otherwise, you may not make audio or video recordings of lectures – nor may you edit, re-use, distribute, or re-broadcast any of the material posted to the course website.

### 3. Health and Wellness:

Information regarding health and wellness-related services available to students may be found at <http://www.health.uwo.ca/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/>) for a complete list of options about how to obtain help.

### 4. Support Services

There are various support services around campus. These include, but are not limited to:

- *Student Development Centre* -- <http://www.sdc.uwo.ca/ssd/>
- *Student Health & Wellness* -- <http://www.health.uwo.ca/>
- *Registrar's Office* -- <http://www.registrar.uwo.ca/>
- *Ombudsperson Office* -- <http://www.uwo.ca/ombuds/>

### 5. Documentation for Academic Accommodation (Illness, Medical/Non-Medical Absences):

[http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page\\_12](http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12)

Students who experience an extenuating circumstance (illness, injury, or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- Submitting a Self-Reported Absence (see below for conditions)
- For medical absences exceeding 48 hours, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to their Academic Counselling in their Faculty of registration in order to be eligible for Academic Consideration; or
- For non-medical absences exceeding 48 hours, submitting appropriate documentation (e.g., obituary, police report, accident report, court order, etc.) to Academic Counselling in their Faculty of registration in order to be eligible for academic consideration. Students are encouraged to contact their Academic Counselling unit to clarify what documentation is appropriate.

Students seeking academic consideration **must communicate with their instructors no later than 24 hours** after the end of the period covered by either the self-reported absence or SMC, or immediately upon their return following a documented absence.

**The following conditions are in place for self-reporting of medical or extenuating circumstances:**

- a. a maximum of two self-reported absences between September and April and one self-reported absence between May and August;
- b. any absences in excess of the number designated in clause a above will require students to present a Student Medical Certificate (SMC) or appropriate documentation supporting extenuating circumstances to the Academic Counselling unit in their Faculty of registration no later than two business days after the date specified for resuming responsibilities.
- c. The duration of the excused absence will be for a maximum of 48 hours from the time the Self-Reported Absence form is completed through the online portal, or from 8:30 am the following morning if the form is submitted after 4:30 pm;
- d. The duration of the excused absence will terminate prior to the end of the 48-hour period should the student undertake significant academic responsibilities (write a test, submit a paper) during that time;
- e. The duration of an excused absence will terminate at 8:30 am on the day following the last day of classes each semester regardless of how many days of absence have elapsed;
- f. Self-reported absences will not be allowed for scheduled final examinations; for midterm examinations scheduled during the December examination period; or for final lab examinations scheduled during the final week of term;
- g. Self-reporting may not be used for assessments (e.g. midterm exams, tests, reports, presentations, or essays) worth more than 30% of any given course;

For medical and non-medical absences that are not eligible for self-reporting Kinesiology students must submit an Academic Consideration Request form found online [https://www.uwo.ca/fhs/kin/undergrad/files/accommodation\\_request.pdf](https://www.uwo.ca/fhs/kin/undergrad/files/accommodation_request.pdf) in addition to an SMC or appropriate documentation in the event of a non-medical absence. These documents will be retained in the student's file, and will be held in confidence in accordance with the University's Official Student Record Information Privacy Policy.

## **6. Grades:**

Where possible assignment objectives and rubrics will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you must wait 24 hours from the receipt of the assignment to approach the instructor or TA. In doing so, please make an appointment and prepare in writing, with evidence, why you feel your grade is inappropriate. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same. Note that calculations errors (which do occur!) should be brought to my attention immediately.

Generally, students can expect some form of feedback on their performance in a course before the drop date.

- November 12<sup>th</sup>, 2021 (for first term half-courses)
- November 30<sup>th</sup>, 2021 (for full-year courses)
- March 14<sup>th</sup>, 2022 (for second term half-or full year courses)



A+	90-100	<i>One could scarcely expect better from a student at this level</i>
A	80-89	<i>Superior work that is clearly above average</i>
B	70-79	<i>Good work, meeting all requirements and eminently</i>
C	60-69	<i>Competent work, meeting requirements</i>
D	50-59	<i>Fair work, minimally acceptable.</i>
F	below 50	<i>Fail</i>

Rounding of Grades (for example, bumping a 79 to 80%) is a practice some students request. **This practice will not occur here.** The edges of this course are clear. The mark attained is the mark you achieved and the mark assigned; there is no rounding to the next grade level, or 'giving away' of marks. Please don't ask me to do this for you; the response will be "please review the course outline where this is presented".

## 7. Student Code of Conduct

The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behavior that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed and set out the disciplinary procedures that the University will follow. For more information, visit <https://www.uwo.ca/univsec/pdf/board/code.pdf>