

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

**KIN 4433B - Physiology of Exercise Training  
Winter 2021**

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**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):**

Investigation of current knowledge of the prescription and the physiological effects of training, with emphasis on aerobic and anaerobic energy systems. Training programs for healthy and diseased adults are both discussed.

**Prerequisite(s):** [Kinesiology 2230A/B](#), [Kinesiology 3337A/B](#).

**Extra Information:** 1 lecture hour, 2 lab hours (every two weeks). Note: Priority to BSc Honors Specialization Kinesiology students.

*You are responsible for ensuring that you have successfully completed all course prerequisites, 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:

Recurrent exposure of the human body to metabolic and physical stress promotes changes to the anatomical and physiological systems that support the stress response. These fortuitous “adaptations” allow us to more efficiently produce and endure higher stress levels. This concept is the basis of exercise training where exercise (i.e., the metabolic or physical stress) is chronically imposed (i.e., hours, days, weeks) to achieve improvements in biological fitness (i.e., anatomical and physiological adaptations) and enhance performance (i.e., lift heavier, cover a distance faster). It is well established that improvements in fitness (i.e., the *response*) are scaled to intensity (i.e., the *stimulus*). Therefore, exercise intensity is the key element for inducing adaptation. This “stimulus-response” relationship will provide the framework for this course. Through lecture and laboratory experiences, students will be provided an up-to-date synthesis of the theoretical aspects of “exercise intensity”, experience with applying this knowledge to interpret exercise testing responses, and the practical skills to use exercise assessment for accurate prescription of exercise training. The course will focus on endurance, middle-distance, sprint, and resistance training exercise, the metabolic systems that contribute to these exercise types, and methods and mechanisms by which they may be improved to enhance performance.

## 2. Learning Outcomes:

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

1. Identify the energy systems contribution to different types and durations of exercise;
2. Define aerobic exercise intensity based on “intensity domains” and describe/recognize the unique physiological response profiles of and implications for exercise within each intensity domain.
3. Explain why aerobic exercise prescription systems endorsed by leading exercise science bodies in Canada (Canadian Society for Exercise Physiology) and abroad (American College of Sports Medicine) are inadequate.
4. Collect, analyze and interpret exercise test data, correctly evaluate aerobic and anaerobic fitness, (e.g. maximal oxygen uptake, gas exchange threshold, critical power) and recognize normal intensity-dependent response profiles (blood lactate and gas exchange responses).
5. Use and execute unique exercise testing protocols and their data to correctly prescribe aerobic exercise intensity.
6. List the common anatomical and functional adaptations to exercise training and explain specifically how they improve exercise performance or capacity.
7. Describe the physiological determinants of exercise performance in endurance, middle-distance, sprint, and resistance exercise various and specific training features/formats to improve each determinant.

## 3. Schedule:

### 3.1. Lecture

Lecture Date	Lecture Topic
Jan 14	Introduction to Physiology of Exercise Training
Jan 21	Energy Systems Contribution to Exercise
Jan 28	Aerobic Exercise Prescription
Feb 4	Exercise Intensity Domains and Threshold Detection
Feb 11	Methods to Prescribe Domain-Specific Aerobic Exercise
Feb 13 - 21	<b>READING WEEK</b>
Feb 25	Determinants of Endurance Performance
Mar 4	Exercise Training Strategies to Enhance Aerobic Performance
Mar 11	Physiological Adaptations to Chronic Endurance Training

Mar 18	Determinants of Sprint Performance
Mar 25	Physiological Adaptations to Chronic Sprint Training
Apr 1	Resistance Training: Muscular Strength, Stamina, and Speed
Apr 8	Physiological Adaptations to Chronic Resistance Training

### 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 2,3, 4 and 5, week 2 sections 6, 7, 8 and 9. 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.

Labs begin the week of January 18<sup>th</sup>.

Lab	Date	Lab Topic	Readings
1	Group 1: January 18-22 <sup>nd</sup> Group 2: January 25-29 <sup>th</sup>	Aerobic exercise prescription and incremental exercise	To be posted on OWL
2	Group 1: February 1-6 <sup>th</sup> Group 2: February 8-12 <sup>th</sup>	Aerobic exercise prescription and exercise thresholds	To be posted on OWL
3	Group 1: February 22-26 <sup>th</sup> Group 2: March 1-5 <sup>th</sup>	Intensity domain-based exercise prescription	To be posted on OWL
4	Group 1: March 8-12 <sup>th</sup> Group 2: March 15-19 <sup>th</sup>	Tests to identify sustainable vs unsustainable endurance exercise	To be posted on OWL
5	Group 1: March 22-26 <sup>th</sup> Group 2: April 29 <sup>th</sup> -2 <sup>nd</sup>	Methods of assessment for resistance training programming	To be posted on OWL

#### Notes:

1. All lectures will be posted on OWL before class begins.
2. We will attempt to cover all material as indicated above but it is possible that we might not complete all listed material, or that additional material may be added.
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 I – Lab Assignments	Value: 40% (see breakdown below)	Date: See Schedule
Lab Assignment #1	10% Analysis and interpretation of data collected in Lab #1 and 2 <ul style="list-style-type: none"> <li>• <u>due</u>: one week after 1<sup>st</sup> lab</li> </ul>	
Lab Assignment #2	10% Analysis and interpretation of data collected in Lab #3	

Lab Assignment #3	<ul style="list-style-type: none"> <li>• <u>due</u>: one week after 2<sup>nd</sup> lab</li> </ul>	
Lab Assignment #4	<p>10% Analysis and interpretation of data collected in Lab #4</p> <ul style="list-style-type: none"> <li>• <u>due</u>: one week after 3<sup>rd</sup> lab</li> </ul> <p>10% Analysis and interpretation of data collected in Lab #5</p> <ul style="list-style-type: none"> <li>• <u>due</u>: one week after 4<sup>th</sup> lab</li> </ul>	
<b>Component II – Midterm Exam</b>		
<b>Component II – Midterm Exam</b>	<b>Value: 25%</b>	<b>Date: February 25<sup>th</sup></b>
Mid-term will cover all lecture and lab material (including readings) from the 1 <sup>st</sup> day of class up to the mid-term date unless otherwise specified.	~1 - 2 hour exam, online, time to be determined. <ul style="list-style-type: none"> <li>• Multiple choice</li> </ul>	
<b>Component III – Final Exam</b>		
<b>Component III – Final Exam</b>	<b>Value: 35%</b>	<b>Date: Final Exam Period</b>
Final exam is cumulative, covering lecture material, laboratory content, and readings from the entire course.	~2 - 3 hour exam during formal examination period after classes have ended <ul style="list-style-type: none"> <li>• Part 1: Mostly multiple choice, some short answer</li> <li>• Part 2: Analysis of exercise data and short answer interpretations</li> </ul>	

Assignments are due as stated in the course syllabus or on OWL. Electronic copies of lab assignments are to be submitted on OWL. Assignments must be submitted no later than 11:59 pm on the specified due date. 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 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.

## 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>, 2020 (for first term half-courses)
- November 30<sup>th</sup>, 2020 (for full-year courses)
- March 14<sup>th</sup>, 2021 (for second term half 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>