

**KIN 3330F – Laboratory in Exercise Physiology  
FALL 2022**

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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):**

This course focuses on experiments designed to highlight the physiological response to exercise and to introduce basic techniques for fitness evaluation.

**Prerequisite(s):** [Kinesiology 2230A/B](#). Priority to BSc Honours Specialization Kinesiology students. **Corequisite(s):** [Kinesiology 3337A/B](#).

**Extra Information:** 2 lecture hours, 2 laboratory hours.

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

**Statement on Prerequisite Checking**

*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

The most important requirement for exercise performance is the transport of oxygen (O<sub>2</sub>) to support the bioenergetic processes in muscle cells and elimination of carbon dioxide (CO<sub>2</sub>) formed as a by-product of muscle metabolism. Thus, an appropriate respiratory and cardiovascular response is necessary to meet the demands imposed by increases in muscle metabolism. This course will explore the use of non-invasive (respiratory gas exchange) and minimally invasive (blood sampling) techniques and specialized exercise testing to provide an experiential and mechanistic basis for: i) understanding integrative responses to exercise at different intensities; ii) evaluation of fitness and performance; iii) exercise prescription; and iv) development of effective exercise interventions in research and practical (e.g., exercise training) settings.

Laboratory protocols will allow students to collect, analyze, and interpret exercise test data, correctly evaluate aerobic fitness, (e.g., maximal O<sub>2</sub> uptake, O<sub>2</sub> uptake kinetics, lactate threshold, critical power), recognize normal intensity-dependent physiological response profiles (blood lactate and gas exchange responses), and accurately prescribe aerobic and anaerobic exercise. Lab data and protocols will be written-up and submitted as a “manuscript-style” lab report. Students will receive feedback on written work to allow them to develop their scientific writing skills.

## 2. Learning Outcomes

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

1. Utilize common exercise physiology laboratory equipment (cycle ergometers; gas mixing chambers) and techniques (respired gas exchange; blood sampling) to monitor and assess physiological and metabolic responses to exercise.
2. Understand how these physiological and metabolic responses change at different intensities of exercise.
3. Collect, analyze, and interpret exercise test data to correctly evaluate aerobic and anaerobic or muscular fitness.
4. Use incremental exercise to identify exercise thresholds and explain the underlying physiological mechanisms that produce those thresholds.
5. Apply exercise testing and exercise prescription to elicit targeted physiological and metabolic responses to exercise (i.e., accurately control exercise intensity).
6. Perform scientific literature searches and reviews.
7. Communicate scientific information in a written report – i.e., describe and report data and findings collected in a laboratory setting and explain and compare these responses using information (i.e., data, ideas) from the published literature.

## 3. Schedule

### 3.1 Lecture

The following is a tentative schedule of content. Topics and the specific weeks on which they are delivered may change. The first lecture will be on Monday September 12<sup>th</sup>.

Lecture Week	Lecture Topic
1	Course intro & “Preparing a scientific manuscript I”
2	Exercise intensity, duration, and energy systems
3	Critical power
4	Oxygen uptake kinetics
5	<b>THANKSGIVING</b>
6	Exercise thresholds
7	Preparing a scientific manuscript II
8	<b>READING WEEK</b>

9	Aerobic exercise prescription
10	Blood lactate
11	Muscle power
12	Laboratory determinants of performance
13	<b>REVIEW FOR FINAL EXAM</b>

### 3.2. Lab

Each lab runs for 1 or 2 weeks as indicated in the Table below. You attend one lab every week. Lab section numbers correspond to the day and time in which the lab sessions will take place.

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 and the manuscript assignment.

Labs begin the week of September 19<sup>th</sup>. Note also that reading week occurs within Week 8, therefore it is not listed in the dates below.

Lab attendance will be taken. **If you do not attend a lab** and the instructor does not receive legitimate documentation pardoning the student for their absence, they will automatically receive a grade of “zero” on the lab assignment component for that lab.

Date	Lab Topic
Week 1	Introduction to the Exercise Physiology Lab
Weeks 2 and 3	Protocol 1: Critical Power
Weeks 4 and 5	Protocol 2: Oxygen Uptake Kinetics
Week 6	Protocol 3: Exercise Thresholds
Weeks 7 and 9	Protocol 4: Aerobic Exercise Prescription
Week 10	Protocol 5: Blood Lactate
Week 11	Protocol 6: Muscle Power
Week 12	Open Q/A with TAs
Week 13	No labs

#### Notes:

1. All lecture and laboratory 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 may 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:

There is no required textbook for the course. All required readings will be posted on OWL or listed amongst the references for each lab protocol.

## 5. Course Evaluation Plan:

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

Component	Category	Value
I	Lab Assignments	30%
II	Scientific Manuscript	40%
III	Lab Exam	30%

Grades are a measure of the performance of a student in individual courses. Each student shall be judged on their knowledge and command of the course materials.

Lab Assignments	Value: 30%	Dates: See below
Lab Assignment #1	5% analysis and interpretation of data collected in Protocol 1 <ul style="list-style-type: none"> <li>• <u>due:</u> October 6<sup>th</sup></li> </ul>	
Lab Assignment #2	5% Analysis and interpretation of data collected in Protocol 2 <ul style="list-style-type: none"> <li>• <u>due:</u> October 20<sup>th</sup></li> </ul>	
Lab Assignment #3	5% Analysis and interpretation of data collected in Protocol 3 <ul style="list-style-type: none"> <li>• <u>due:</u> October 27<sup>th</sup></li> </ul>	
Lab Assignment #4	5% Analysis and interpretation of data collected in Protocol 4 <ul style="list-style-type: none"> <li>• <u>due:</u> November 17<sup>th</sup></li> </ul>	
Lab Assignment #5	5% Analysis and interpretation of data collected in Protocol 5 <ul style="list-style-type: none"> <li>• <u>due:</u> November 24<sup>th</sup></li> </ul>	
Lab Assignment #6	5% Analysis and interpretation of data collected in Protocol 6 <ul style="list-style-type: none"> <li>• <u>due:</u> December 1<sup>st</sup></li> </ul>	
Manuscript	Value: 40%	Dates: see below
Mini report: Introduction	5% Draft of manuscript introduction <ul style="list-style-type: none"> <li>• <u>due:</u> October 12<sup>th</sup></li> </ul>	
Mini report: Results	5% Draft of manuscript results <ul style="list-style-type: none"> <li>• <u>due:</u> November 7<sup>th</sup></li> </ul>	
Scientific Manuscript	30% Complete draft of scientific manuscript <ul style="list-style-type: none"> <li>• <u>due:</u> December 8<sup>th</sup></li> </ul>	
Laboratory Final Exam	Value: 30%	Date: TBA
Laboratory exam will cover material from all labs and will involve analysis and interpretation of exercise responses.	3-hour, in-person exam. <ul style="list-style-type: none"> <li>• Combination of multiple choice and analysis of exercise data accompanied by short answer interpretations.</li> </ul>	

All assignments will be posted on OWL well in advance of their corresponding deadlines. Due dates for assignments are listed in the course syllabus and on OWL. Electronic copies of lab

assignments are to be submitted on OWL. Assignments must be submitted no later than 11:59 am 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 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 be an opportunity to write the exam at a later date. Makeup tests and examinations may not be offered in the same format as the original exam. For example, the exam may shift from a multiple choice to an essay style examination.

## Course/University Policies

The website for Registrar Services is <http://www.registrar.uwo.ca>.

### 1. Email

In accordance with policy, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

### 2. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the Academic Calendar ([westerncalendar.uwo.ca](http://westerncalendar.uwo.ca)).

**Plagiarism:** Student work is expected to be original. Plagiarism is a serious academic offence and could lead to a zero on the assignment in question, a zero in this course, or your expulsion from the university. You are plagiarizing if you insert a phrase, sentence or paragraph taken directly from another author without acknowledging that the work belongs to him/her. Similarly, you are plagiarizing if you paraphrase or summarize another author's ideas without acknowledging that the ideas belong to someone else. All 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 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 ([www.turnitin.com](http://www.turnitin.com)).

**Re-submission of Previously Graded Material:** Without the explicit written permission of the instructor, you may not submit any academic work for which credit has been obtained previously, or for which credit is being sought, in another course or program of study in the University or elsewhere.

**Use of Statistical Pattern Recognition on Multiple Choice Exams:** 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.

### 3. Use of Electronic Devices

**During Exams:** Unless you have medical accommodations that require you to do so, or explicit permission from the instructor of the course, you may not use any electronic devices during ANY tests, quizzes, midterms, examinations, or other in-class evaluations.

**During Lectures and Tutorials:** Although you are welcome to use a computer during lecture 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. 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.**

**Personal Response Systems** ("clickers") may be used in some classes. For those classes in which we use this technology, it is your responsibility to ensure that the device is activated and functional. You must speak with the course instructor immediately, if you have any concerns about whether or not your clicker is malfunctioning.

You must use only your own clicker. For all components of this course in which clicker records are used to compute a portion of the grade:

- The use of somebody else's clicker in class constitutes a scholastic offence;
- The possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offense

#### 4. Academic Considerations and Absences from Lectures and Assessments

**Religious Accommodation:** When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request (in writing) any necessary academic considerations at least two weeks prior to the holiday to the academic counsellors in their Home Department. Additional information is provided in the [Western Multicultural Calendar](#).

**Academic Accommodation:** Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. Students with ongoing accommodation needs within this course are also encouraged to contact [Accessible Education](#), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found [here](#).

**Academic Consideration:** The University recognizes that a student's ability to meet their academic responsibilities may, on occasion, be impaired by extenuating circumstances that are medical or compassionate in nature. These extenuating circumstances may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. In all cases, students are advised to consult with the academic counsellors in their home units, at their earliest opportunity. Academic counsellors may refer students to [Accessible Education](#) for ongoing academic accommodations.

Most forms of academic consideration require documentation, and this documentation is to be submitted to academic counsellors within five (5) business days of their return to academic responsibilities. Any such 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](#). Once the petition and supporting documents have been received and assessed, appropriate academic considerations shall be determined by academic counseling, in consultation with the student's instructor(s). Academic considerations may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, arranging Special Exams or Incompletes, re-weighting course requirements, or granting late withdrawals without academic penalty. Academic considerations shall be granted only where the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete their academic responsibilities. (Note – it will not be sufficient to provide documentation indicating simply that the student “was seen for a medical reason” or “was ill.”).

Whenever possible, students who require academic considerations should provide notification and documentation in advance of due dates, examinations, etc. Under no circumstances are students expected to submit rationales for (or documentation of) any absences, to course instructors. Students are, however, required to follow-up with course instructors, in a timely fashion, to identify the ways in which the academic consideration will be implemented.

**Examination Conflicts:** A student completing tests or examinations with flexible submission times (e.g., where one or more evaluation is a take-home assessment) cannot request alternative arrangements unless a conflict cannot be avoided by rescheduling writing the exam to a different time within the window specified by the instructor. This applies to direct conflicts as well as “heavy load” conflicts (e.g., three exams within a 23-hour period). The student should discuss any concerns about a potential conflict and/or request academic considerations with their academic counselling unit prior to the deadline to drop a course without academic penalty

In the case of online tests and examinations, use of a “Conflict Room,” wherein student can write two proctored exams concurrently, will be interpreted as arrangements for continuous proctoring.

## 5. Contingency Plan for an In-Person Class Pivoting to 100% Online Learning

In the event of a situation that requires this course to pivot to online content delivery, 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

Note that disruptive behavior 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.

## 6. Online Proctoring

Tests and examinations in this course may be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>.

## 7. Grades

Where possible assignment objectives and rubrics will be posted on OWL.

Generally, students can expect some form of feedback on their performance in a course before the drop date. The drop date for first term half-course is November 12<sup>th</sup>, 2022.

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 satisfactory</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%): This is a practice some students request. The final grade documented is the grade that you have achieved. 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".

**Appealing a Grade Within this Course:** You have the right to appeal any grade within this course. The grounds for a grade appeal may be one or more of: medical or compassionate circumstances, extenuating circumstances beyond the student's control, bias, inaccuracy, or unfairness. All grounds advanced in a request for relief must be supported by a clear and detailed explanation of the reasons for the request together with all supporting documentation.

Appeals generally proceed in this order:

1. Course instructor (informal consultation)
2. Department Chair (submission of written request)
3. The Dean of the Faculty (submission of written request)

In the case of perceived procedural unfairness, steps 2 and 3 are carried out within the Department and Faculty offering the course. In the case of extenuating medical or compassionate circumstances that impact on a grade, steps 2 and 3 are carried out within a student's Home Department and Faculty.

A request for relief against a mark or grade must be initiated with the instructor as soon as possible after the mark is issued. In the event that the instructor is not available to the student, or fails to act, or if the matter is not resolved satisfactorily with the instructor, a written request for relief must be submitted to the Chair of the Department within three weeks of the date that the mark was issued. In



the case of a final grade in a course, the written request for relief must be submitted to the Chair of the department by January 31<sup>st</sup> (for first-term half courses) or June 30<sup>th</sup> (for second-term half courses or full-year courses)

## 8. Support Services

**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.

There are various support services around campus and these include, but are not limited to:

- *Student Development Centre* - <http://www.sdc.uwo.ca/ssd/>
- *Ombudsperson Office* - <http://www.uwo.ca/ombuds/>

## 9. 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 behaviour 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>