

**THE UNIVERSITY OF BRITISH COLUMBIA  
SCHOOL OF HUMAN KINETICS  
HKIN 375 (2007)  
EXERCISE PHYSIOLOGY II**

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**Instructor:** Dr. Darren E. R. Warburton  
**Office Hours:** Mondays and Wednesdays @ 9:30-11:30 a.m.  
**Office Location:** Rm. 205, Unit II Osborne Centre

**Teaching Assistants:** Jessica Scott (jmscott.ubc@gmail.com)  
 Shirley Wong (scwong.ubc@gmail.com)

**LECTURES (Hugh Dempster Pavilion (DMP) Rm. 310, 6245 Agronomy Road V6T 1Z4)**  
 Mon/Wed 8:00 – 9:00 a.m.

**LABORATORIES (Unit II Osborne Centre)**

Section A	Mondays	13:00 - 15:00
Section B	Tuesdays	18:00 - 20:00
Section C	Wednesdays	13:00 - 15:00
Section D	Wednesdays	15:00 - 17:00
Section E	Thursdays	18:00 - 20:00
Section F	Fridays	13:00 - 15:00

**PREREQUISITES**

Third Year Standing

**REQUIRED TEXT**

McArdle WD, Katch FI, and Katch VL. *Exercise Physiology: energy, nutrition, and human performance*. 6<sup>th</sup> edition. Lippincott, Williams and Wilkins Publishing, 2006.

**REQUIRED LABORATORY MANUALS**

- Warburton DER. Human Kinetics 375 Physiology of Exercise Laboratory Manual (available on WebCt).
- Kolkhorst FW, and Buono MJ. Virtual Exercise Physiology Laboratory (CD-ROM with Lab Manual). Lippincott, Williams and Wilkins Publishing, 2004.

**EVALUATION**

1. Midterm (in class on **Monday March 19, 2007**) 30%
2. Laboratory Sessions and Reports (2 due) 40%
3. Final exam 30%

**LEARNING OUTCOMES**

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

1. Describe the acute responses to dynamic exercise from a 'systems' approach (heart, lung, muscle).
2. Integrate knowledge of the main physiological systems and to describe training responses to exercise.
3. Understand the physiology of exercise in 'special cases.'

**INFORMATIVE WEBSITES**

WebCT  
 Canadian Society for Exercise Physiology  
 Sport Science

<https://www.elearning.ubc.ca/home/index.cfm>  
<http://www.csep.ca>  
<http://www.sportsci.org>

## **COURSE POLICIES**

1. Full attendance is required at all lectures. Due to the integrated nature of the course material, absence from lectures has the potential to impair the ability of students to integrate course content.
2. Full attendance to all laboratory sessions of the course is mandatory. Students missing two or more of the laboratory sessions of the course will receive an automatic grade of zero (0%) on the laboratory portion of their final grade (i.e., 0 out of 40%). Students who fail to contribute to the data collection or write-up of a laboratory assignment (report) will receive an automatic grade of zero (0%) on the laboratory portion of their final grade. **THERE ARE NO EXCEPTIONS TO THIS POLICY!**
3. Students who know in advance that they will be unavoidably absent should apply for special accommodation from the instructor as soon as possible to determine how course requirements will be met. Supportive documentation must be submitted to the Undergraduate Advising Centre, at the earliest possible date. The School will not normally take into account untimely notification and a minimum of two weeks notification is expected. It is expected that if a student cannot attend a certain section of the laboratory that they will make arrangements with the teaching assistant(s) to attend another section of that laboratory.
4. \*\*\*In circumstances (such as varsity athletics or family obligations) where a student will be unavoidably absent from a mid-term or final exam s/he will be required to complete the examination prior to the scheduled date. Students failing to do so will receive an automatic grade of zero (0%) on this portion of their final grade. **THERE ARE NO EXCEPTIONS TO THIS POLICY!**
5. Where prior consultation is not possible, students should contact the instructor as soon as possible and submit supportive documentation to the Undergraduate Advising Centre. Students also have the right to request Academic Concession from the Undergraduate Advising Centre.
6. Students who miss the examination in December MUST apply to the Undergraduate Advising Office at the earliest possible date to request consideration for Academic Concession. Students will be asked to complete an Academic Concession Form and to provide supportive documentation. Academic Concession is not a right and can be granted only by the Undergraduate Advising Office.
7. Students, whose attendance or performance may be severely affected by medical, emotional, or other disabilities, should consult with the instructor early in the term to discuss any special accommodations that might be needed in order to complete course requirements. Supportive documentation from either the Disability Resources Centre or a physician must be submitted to the Undergraduate Advising Office.
8. It is advisable that students familiarize themselves with the policies of the University of British Columbia. Important excerpts from the UBC calendar are provided below. For more information please see: <http://students.ubc.ca/calendar/>
  - "Students may request academic concession in circumstances that may adversely affect their attendance or performance in a course or program. Such circumstances include: a medical condition, emotional or other problems, and religious observance. Students who intend to, or, as the result of circumstance, must request academic concessions should notify their dean or director, or their instructor(s)".
  - "Instructors are not required to make allowance for any missed test or incomplete work that is not satisfactorily accounted for."
  - "The University accommodates students with disabilities who have registered with the Disability Resource Centre. The University accommodates students whose religious obligations conflict with attendance, submitting assignments, or completing scheduled tests and examinations. A list of religious holidays involving fasting, abstention from work or study, or participation in all-day or fixed-time activities is available at <http://students.ubc.ca/publications/multifaith/>. Please let your instructor know in advance, preferably in the first week of class, if you will require any accommodation on these grounds. "Students who plan to be absent for varsity athletics, family obligations, or other similar authorized commitments, cannot assume they will be accommodated, and should discuss their commitments with the instructor before the drop date."
  - "Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes."

### **Tape Recording of Lectures**

Students are not permitted (unless with special concession from the instructor) to tape record, video record, or otherwise record the course lectures or laboratories in HKIN 375. Students with disabilities who are unable to take or read notes may record lectures for their own personal use only. Students are asked to obtain a letter stating the need for special accommodation from the Disability Resources Centre. Students must receive

signed permission from the instructor to record the lectures. It is recommended that these students sit towards the front of the lecture theatre and/or laboratory classroom to enable clear sound transmission.

In instances, where special accommodation has been granted by the instructor, the information contained in the lecture recordings is solely for the personal use of the student receiving special accommodation. Lectures recorded for this purpose may not be shared with other people without the expressed written consent of the instructor. Recorded lectures may not be used in any way against a faculty member, other lecturers, teaching assistants, or students whose classroom comments are recorded during the normal course of the lecture. Students are cautioned that lectures, demonstrations, and any other course material produced by an instructor are the intellectual property of the instructor. Information contained in the recordings is protected under the Copyright Act of Canada and may not be published or quoted without the expressed written consent of the instructor. Misuse of these recordings will be considered academic misconduct. It is important to note, that in previous experiences the use of recording devices has limited the open and candid discussions that are the cornerstone of this self-directed course.

## **EVALUATION PROCEDURES**

### **1) Mid-Term (30%; in class Monday, March 19, 2007)**

This exam will cover all areas discussed up to **Monday, March 19, 2007**.

### **2) Laboratories (40%)**

This course will be interactive in nature. Therefore, student attendance to each laboratory is mandatory. Information derived from the laboratories will be essential for the mid-term and final exams. Four class-based laboratories (in addition to an introductory laboratory session) will be conducted during this course. These laboratories will build upon the knowledge gained in the lectures and from the readings. ***Students missing two or more of the laboratory sessions (including the introductory laboratory) of the course will receive an automatic grade of zero (0%) on the laboratory portion of their final grade. Students who fail to contribute to the data collection or write-up of a laboratory assignment (report) will receive an automatic grade of zero (0%) on the laboratory portion of their final grade. THERE ARE NO EXCEPTIONS TO THIS POLICY!*** The laboratories are interactive in nature, which requires that the students have read the required readings before each class.

For each laboratory, students will be divided into groups. Each group will conduct their own experiment and complete the associated data collection sheets. For two of the four practical laboratories, there is a formal written component (for each group) that will be graded. The laboratory sessions that require a formal written component (from each group) are due on the following dates: **Laboratory Report #1 Friday March 2, 2007 and Laboratory Report #2 Thursday April 5, 2007.**

### **3) Final Exam (30%; scheduled during the examination period)**

This exam will be all-inclusive covering all topics discussed throughout the course (including lectures and laboratories).

## **COURSE FORMAT**

This course incorporates self-directed learning techniques, and as such requires that the students have completed their readings before each class and that they take an active role in the lectures and laboratories. Throughout the course, learning objectives will be placed on the WebCT website for this course (<https://www.elearning.ubc.ca/home/index.cfm>). There will be discussions in each class regarding the course readings with the assumption that the students have completed these readings before the lecture.

This course relies heavily on self-directed learning. The marks may be scaled to maintain the normal average and distribution for this course. It is important to note, that marks in this course are awarded based on hard work and dedication and not through negotiation.

## **EXAM TUTORIALS**

An exam tutorial will be held prior to the mid-term and final exams. Your teaching assistants will lead these tutorials. Students are expected to bring problems to class such that the group of students can work together to solve the problem. The teaching assistant will serve as a facilitator for this process providing assistance and direction where required. The tutorial dates will be conducted in the Undergraduate Physiology Teaching Laboratory (Gym G, Unit II Osborne Centre). The time and dates of these tutorials will be determined early into term.

## **COURSE CONTENT**

The course content is that of the required readings, and information (including handouts) derived from the lectures and laboratories. Below is a general overview of the topics to be covered in this course. Owing to the interactive nature of this course, the areas covered are subject to change depending on the requirements and/or requests of the class. As such, the dates provided for the recommended readings are approximates and may change depending on the needs of the class.

<b>Required Readings</b>	<b>Dates of Lectures (approximate)</b>
Chapter 8: Measuring Human Energy Expenditure	Jan 8, 10, 15
Chapter 12: Pulmonary Structure and Function	Jan 17, 22, 24
Chapter 13: Gas Exchange and Transport	Jan 29, 31
Chapter 14: Dynamics of Pulmonary Ventilation	Feb 5, 7
Chapter 15: The Cardiovascular System	Feb 12, 14, 26
<i>MID-TERM BREAK</i>	<i>Feb 19-23</i>
Chapter 16: Cardiovascular Regulation and Integration	Feb 28, Mar 5, 7
Chapter 17: Functional Capacity of the Cardiovascular System	Mar 12, 14
<b>MID-TERM EXAMINATION (IN CLASS)</b>	<b>Monday March 19, 2007</b>
Chapter 25: Exercise and Thermal Stress	Mar 21, 26
Chapter 27: Microgravity: The Last Frontier	Mar 28, Apr 2
Chapter 24: Exercise at Medium and High Altitude	Apr 4, 11
<b>FINAL EXAM</b>	<b>FINAL EXAM PERIOD</b>

## **LABORATORY SESSIONS**

<b>Laboratory</b>	<b>Dates of Laboratories</b>
Introduction to the Undergraduate Laboratory (attendance required)	Jan 15-19
Laboratory One: Pulmonary Function before and after Maximal Exercise	Jan 22 - 26
Laboratory Two: Maximal Aerobic Power	Jan 29 – Feb 2
<b>*Laboratory Report #1</b>	<b>Friday March 2, 2007</b>
Laboratory Three: Advanced Electrocardiography	Mar 5-9
Laboratory Four: Exercise and Environmental Stress	Mar 12-16
<b>*Laboratory Report #2</b>	<b>Thursday April 5, 2007</b>

\*, For the first laboratory assignment, each student group has the option of either handing in a report for Laboratory One or Laboratory Two. For the second laboratory assignment, each student group has the option of either handing in a report for Laboratory Three or Laboratory Four.

All laboratory assignments are due at 4:00 pm. In an attempt to save upon excessive paper waste, we are attempting for the first time a completely online submission process wherein **one person from each group** submits the laboratory report (on behalf of the entire group) via WebCt. Groups are to create a single document (file) using Microsoft Word. Instructions regarding this process have been provided from WebCT:

“Students use their own software applications to complete assignments. When naming an assignment file, they must use single-word file names or insert an underscore between words. WebCT does not recognize file names with spaces, or characters that are not numbers or letters.

Submitting an assignment involves two steps:

- upload the file from your computer to WebCT
  - submit the file for marking.
1. From the Assignments screen, locate the assignment you want to submit and click its name. The Assignment screen for that assignment appears.
  2. To choose a file to upload, next to Student files, click Upload file. The Upload File for Assignment screen appears.
  3. Next to Filename, click Browse. Your computer's file browser appears.
  4. Locate and select the file you want to upload. The path and filename of the file appears in the Filename text box.
  5. Click Upload. The Assignment screen for the assignment appears with the name of the uploaded file in the table next to Student files.
  6. If you want to receive email notification that your assignment was submitted successfully, in the Notification text box, enter your email address. Note: If your instructor has not enabled the email notification feature, this text box does not appear.
  7. To submit the uploaded assignment, click Submit assignment. A confirmation message appears.
  8. Click OK. The Assignment Submission Confirmed screen appears. Note: When the assignment has been graded, the status of the assignment on the Assignments screen changes to Graded and your grade appears next to Grade. Click the status Graded to view your instructor's comments about your work.”

Source: <http://www.webct.ubc.ca/web-ct/help>

## REQUIRED READINGS FROM VIRTUAL EXERCISE PHYSIOLOGY LABORATORY

There are several chapters in the Virtual Exercise Physiology Laboratory Manual which will assist greatly in your learning of the complex topics covered in the lectures and laboratories. There are several topics that you can choose from based on your needs. Please feel free to conduct as many virtual laboratories as you want. For this course, key readings include:

- **Unit I: Units of Measure**
- **Unit II: Virtual Laboratory #4 (Cardiovascular Responses to Prolonged Exercise)**
- **Unit II: Virtual Laboratory #5(Training Effects on Cardiovascular Responses to Prolonged Exercise)**
- **Unit II: Virtual Laboratory #6 (Cardiovascular Responses to Graded Exercise)**
- **Unit II: Virtual Laboratory #7 (Training Effects on Cardiovascular Responses to Graded Exercise)**
- **Unit III: Virtual Laboratory #16 (Metabolic Responses to Graded Exercise)**
- **Unit III: Virtual Laboratory #17 (Training Effects on Metabolic Responses to Graded Exercise)**
- **Unit IV: Virtual Laboratory #18 (Thermoregulatory Responses to Prolonged Exercise)**
- **Unit IV: Virtual Laboratory #19 (Heat Acclimation on Thermoregulatory Response to Prolonged Exercise)**
- **Unit IV: Virtual Laboratory #20 (Effects of Altitude on Graded Exercise)**