



lab session for a **legitimate** (see below) reason, you must notify the lab coordinator **in advance**. Appropriate dress (gym wear) **is required** during these labs.

Lab Schedule:

*Each lab is run for 2 weeks. You attend one lab every 2 weeks.*

***Week 1 of each lab; sections 2-4-6-8-10-12***

***Week 2 of each lab; sections 3-5-7-9-11-13***

Labs begin the week of September 17 (Week 1) or September 24 (Week 2)

LAB TOPICS

Lab 1: Enzyme kinetics

Lab 2: Static lung volumes and ventilatory response to incremental exercise.

Lab 3: Oxygen uptake and carbon dioxide response to incremental exercise.

Lab 4: Muscle contractile properties

Evaluation: Evaluation of the student's progress in this course will be assessed via 2 mid-term exams, a laboratory exam and a **COMPREHENSIVE** final exam. Lecture examinations will be

## Lecture Outline:

### Readings

### Topic

#### 1. METABOLISM DURING EXERCISE

- a. What is energy?
- b. Energy value in food
- c. Factors affecting energy production
- d. Anaerobic energy sources
  1. ATP
  2. CP
  3. Glycolysis
- e. Aerobic energy sources
  1. Carbohydrate
  2. Lipid
- f. Significance of various energy sources and foods
- g. Oxygen uptake
  1. indirect calorimetry
- h. Lactic acid production
- i. EPOC
- j. Metabolic causes of fatigue

### Learning Objectives To be able to:

1. Identify the amount of energy derived from food of different types.
2. To understand those factors which may influence energy release.
3. Explain the basic energy stores, their power and capacity.
4. Identify and explain the anaerobic energy stores.
5. Understand the basic aerobic pathways for both carbohydrate and lipid metabolism.
6. Identify the significance of the energy delivery systems to athletic events of various durations.
7. Understand some effects of exercise nutrition
8. Outline the kinetics of the oxygen uptake curve.
9. Differentiate between steady-state and maximum oxygen consumption.
10. Understand the importance of maximal oxygen consumption ( $\text{VO}_2\text{max}$ ) to endurance performance.
11. Understand and be able to calculate  $\text{VO}_2$  via indirect calorimetry.
12. Recognize the meaning and use of ATPS, STPD & BTPS.
13. Understand the concept of RER.
14. Understand the reasons for, and the relative production and importance of lactic acid production.
15. Outline the reasons for and functions of the EPOC.

2. VENTILATION DURING EXERCISE

- a. Lung structure and function
- b. Mechanics of ventilation
- c. Static lung volumes
- d. Gas pressures and exchange
- e. Gas transport in the blood
- f. Ventilatory control
- g. Ventilation during exercise
- h. Ventilation as a limiting factor to exercise

- Learning Objectives
- To be able to:
- 1. Outline lung structure and its relation to function.
  - 2. Outline how lung volume is altered and understand those factors which influence maximal capacity.
  - 3. Identify the static lung volumes and understand their relationship to dynamic ventilation.
  - 4. Explain how gas pressure acts as the driving force for gas exchange.
  - 5. Explain how gas (O<sub>2</sub> and CO<sub>2</sub>) is transported in the blood and the significance of the oxyhemoglobin curve.

3. Indicate the influence of exercise on blood pressure and the determination of mean arterial pressure.
4. Discuss the intrinsic and extrinsic regulation of the cardiac cycle.
5. Discuss those factors controlling blood flow distribution.
6. Outline the factors affecting cardiac output and the influence of

## TRAINING ADAPTATIONS TO EXERCISE

### a. Physiological responses to training

- Learning Objectives
- To be able to:
1. Identify the major cardiovascular, respiratory and muscular adaptations that occur with different forms of training.
  2. Identify the cellular changes of anaerobic and aerobic systems that occur with different forms of training.
  3. Discuss the influence of initial fitness, frequency, duration, intensity, and mode of training on adaptation.

- Note:**
1. All lectures will be posted on WebCT in Power Point format.
  2. During the course of the semester we will attempt to cover the material indicated. It is possible that we might not complete the suggested material, or that additional material may be added.
  3. Lectures will be developed with the text as primary source, but additional material will be commonly included, therefore attendance at lectures is recommended.
  4. The learning objectives associated with each section are designed to assist the student in focusing their reading and effort. The topics to be discussed cannot be considered exclusive however, and the student is responsible for all material covered.
  5. 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.
  6. 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. Further, exams have been scheduled well in advance, hence, planned vacations, job interviews etc. will **not** be accepted as valid reasons to miss a scheduled exam. As a general policy, the instructor will not entertain any questions within a one day period before the day of a scheduled exam. Please note that computer software (ScanExam II) will be employed to check for unusual coincidences in answer patterns that may indicate cheating on multiple choice exams.

## Course/University Policies

1. **Lateness/Absences:** Assignments are due at the beginning of class on the assigned due date and will not be accepted late, except under medical or other compassionate circumstances. Electronic submission of assignments will not be accepted (unless otherwise specified) under any circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. Appropriate documentation for assignments worth less than 10% should be submitted to the Undergraduate office. A missed mid-term examination without appropriate documentation will result in a zero (0) grade. The course policy is not to allow make-ups for scheduled midterms, presentations or final exams, nor to assign a grade of Incomplete without acceptable and verifiable medical (or equivalent compassionate) reasons. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents or illness, death) or similar circumstances.

2. **Written documentation:** Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, examinations, etc. stating specific reasons and dates. Students must follow up with their professors and their Academic Counselling office in a timely manner. Documentation for any request for accommodation shall be submitted directly, as soon as possible, to the appropriate *Academic Counselling Office* of the student's Faculty/School of registration not to the instructor, with a request for relief specifying the nature of the accommodation being requested. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. 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.

See <https://studentservices.uwo.ca/secure/index.cfm> for specific policy and forms relating to





## **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

<http://www.uwo.ca/univsec/board/code.pdf>

## **ENGLISH PROFICIENCY FOR THE ASSIGNMENT OF GRADES**

Visit the website <http://www.uwo.ca/univsec/handbook/exam/english.pdf>

## **SUPPORT SERVICES**