

HK-4550 HUMAN CARDIO-RESPIRATORY PHYSIOLOGY  
Course Outline - Fall 2013

Department of Human Health & Nutritional Sciences  
College of Biological Science  
University of Guelph

**Instructor:** Dr. Jeremy A. Simpson  
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**Classes:**

Monday, Wednesday and Friday - 10:30 - 11:20AM - Rozanski Hall (room 103)

**Review Class/Tutorial/Office Hours:**

Wed – 3:30-4:30PM ANNU 156.

**Calendar Description and Objectives:** The central focus of this course (0.50 credit) is a comprehensive examination of the effects of a variety of physical activity, work and exercise situations on cardio-respiratory adjustments required to meet the increase in metabolic demand in human beings. Immediate adjustments to increased metabolic rate as well as long term cardio-respiratory adaptability will be discussed. The goal of the course is to understand how these systems of energy and substrate delivery – the respiratory and cardiovascular systems – meet the increased energy demand that occurs while engaging in work, exercise or physical activity.

**Course Format and Textbooks:**

The course is taught in lecture format with handouts of diagrams each day. However, the following text books are available in the bookstore if you wish to purchase reference material. Various editions of these texts are on reserve at the library.

1. West, JB. **Respiratory Physiology: The Essentials**. 9th Ed, Lippincott, Williams, Wilkins (LWW), Baltimore, 2012. (~\$60.00)
2. Mohrman, DE, & LJ Heller. **Cardiovascular Physiology**. 7th Ed. Lange Physiology Series, McGraw-Hill, Toronto. 2010. (~\$60.00)

**Reference Texts:**

ACSM's **Advanced Exercise Physiology**. Tipton, CM (ed). Chapters 10-13, Respiratory, Oxygen Transport and Cardiovascular Systems. LWW, Baltimore, 2006.

Vander, AJ, JH Sherman & DS Luciano. **Human Physiology: The Mechanisms of Body Function** 6th or 7th Edition, McGraw-Hill, Toronto, 1994, 1997.

Rowell, LB. **Human Circulation: Regulation during Physical Stress**. Oxford University Press. Toronto. 1986.

Powers, SK, & ET Howley. **Exercise Physiology: Theory and Application to Fitness and Performance**. 6th Ed. McGraw-Hill, New York, NY. 2007.

Guyton, AC. **Textbook of Medical Physiology**. 11th Ed. WB Saunders Co. Toronto, 2006.

McArdle, WD, FI Katch, & VL Katch. **Exercise Physiology: Energy, Nutrition and Human Performance**. 5th Ed. LWW. Baltimore, MD. 2001.

Foss, ML, & SJ Keteyian. **Fox's Physiological Basis for Exercise and Sport**. 6th Edition McGraw-Hill, Toronto, 1998.

### **Evaluation:**

Mid-term exams **are not** cumulative (directly).

1. Mid-Term # 1 – (20-30%)

**Wed. Oct 2<sup>nd</sup>, 2013: 4:30 – 6:00 PM**

Surname A to L - MACN 105

Surname M to Z - MACN 113

(a) Lectures 1 to 10 (Sept 6<sup>th</sup> – Sept 27<sup>th</sup>)

(b) Oct 2<sup>nd</sup> - review class for those who are interested at 10:30 AM.

2. Mid-Term # 2 – (20-30%)

**Wed. Oct 30<sup>th</sup>, 2013: 4:30–6:00 PM**

Surname A to L - MACN 105

Surname M to Z - MACN 113

(a) Lectures 11 to 21 (Sept 30<sup>th</sup> – Oct 25<sup>th</sup>)

(b) Oct 30<sup>th</sup> - review class at 10:30 AM.

(c) Mid-term is one day before 40th class day (Oct 31<sup>st</sup>)

The **Final exam is cumulative** and will have integrative questions.

3. Final Exam. – **December 11, 2013: 11:30AM – 1:30PM** - (40-60%)

(a) Lectures 1 to 36

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COURSE SYLLABUS  
WINTER '11

The lecture material will introduce the physiological concepts using resting and exercise situations to examine how the respiratory and cardiovascular (CV) systems respond to the stress of increasing substrate demand and by-product production while moving about during daily living. The primary goals of the respiratory and CV systems are to maintain the blood gas status and blood pressure in the vascular system within a “normal” or homeostatic range.

Introduction to Respiratory and Cardiovascular Physiology

- \* Interaction with the Environment – Homeostasis, Systems Design, Blood Volume, Factors Limiting Exercise Performance, Control Principles
- \* Carriage of Oxygen and Carbon Dioxide in the Blood

Respiratory Physiology

- \* Control of ventilation
- \* Structure and function of the lungs
- \* Ventilation – how gas gets to the lungs
- \* Diffusion – how gas gets across the blood/gas barrier
- \* Lung blood flow – systemic and local
- \* Ventilation/perfusion relationships
- \* Mechanics of breathing
- \* Acid base regulation and the lung (not in text)
- \* Response of the pulmonary system to exercise and exercise training (not in text)
- \* Diseases of the pulmonary system (not in text)

Cardiovascular Physiology

- \* Anatomical design and terminology of the CV system
- \* Cardiovascular regulation – maintaining blood pressure
- \* Structure and function of the heart
- \* Cardiac cycle and the electrocardiogram
- \* Control of cardiac output.
- \* Control of peripheral resistance and flow
- \* Longer term regulation of blood pressure – interaction with fluid volume (not in text)
- \* Diseases of the cardiovascular system (not in text)
- \* Response of the CV system to exercise and exercise training (not in text)