School of Kinesiology  
Faculty of Health Sciences  
Western University

ADVANCED EXERCISE PHYSIOLOGY:  
Cardiorespiratory and Metabolic Adjustments/Adaptations and Control in Exercise  
Kin 9435a  
Fall, 2017

Instructor:  
J.M. Kowalchuk, PhD  
Canadian Centre for Activity and Aging (HSB 411C)  
jkowalch@uwo.ca

Overview:  
This course will provide an examination of the integration amongst the muscle metabolic and the cardiovascular and respiratory systems and their control. Major themes for the course will be i) the movement of O2 from the atmosphere to the muscle mitochondria, and ii) metabolic response to exercise within various intensity domains of exercise and implications for exercise performance and tolerance. Discussions will focus (to various degrees) on O2 exchange at the lung and muscle; blood flow and O2 delivery to muscle and distribution within muscle; O2 exchange at the capillary-muscle interface and muscle O2 uptake and utilization; and integration and control of metabolic, cardiovascular and respiratory systems and their impact on exercise performance, exercise tolerance and fatigue.

Format:  
The format of the course will consist of tutorial/lecture combined with student presentations and discussions around topic areas, and assigned readings from the textbook and research articles. This course is meant to provide a “graduate experience” and as such, it is important that all students read assigned articles, and become involved through discussions and questions and answers. Students will be asked to provide comments and feedback on student presentations and participation. Also, weekly student presentations will be a key feature of this course. Topics may be covered in more or less detail as dictated by student background and understanding of topics and involvement in discussion. Topics and articles will be assigned on a weekly basis.

Course Objectives:  
Following completion of this course, students will be able to:  
1. better understand the basic processes related to the transfer of oxygen from the atmosphere to the muscle mitochondria  
2. better understand how specific physiological and metabolic system(s) interact and are controlled during exercise, and how they may impact exercise tolerance and fatigue  
3. search for, critically review and synthesize information from published literature  
4. organize and communicate research findings via oral presentations and written reports  
5. have more confidence in asking and responding to questions in a classroom/seminar/conference setting  
6. critically evaluate and provide feedback to peers and colleagues
Course Textbook:

Evaluation (tentative – will be discussed and finalized in class):
Major Term Paper (due near end of term): 20%
Major Presentation (due near end of term): 20%
Weekly Article Reviews and Discussion: 20%
Take Home Exam: 20% (tentative – TBD)
Weekly Student Participation: 20%

(Note - details related to the course evaluation are discussed and may vary from year to year. The course instructor is responsible for assigning grades, but grading for certain components of the course will include additional input from student evaluations. The assignment of a final exam will be discussed and if not part of the overall course evaluation, there will be adjustments to the other course components.)

Information related to presentations and research paper:
Student presentations generally are made on a weekly basis (depending on student enrolment) and are based on assigned readings. The readings generally follow a “theme” and will relate to the topic being discussed. Presentations are “formal” using PowerPoint, usually 15 min in length, and followed by question/answers. Feedback is provided after each presentation.

The “major” research presentation and term paper for Advanced Exercise Physiology: Cardiorespiratory and Metabolic Control and Adaptations should reflect some component of the overall theme of the course – i.e., the transfer of O₂ from the atmosphere to the muscle mitochondria and its utilization during exercise - the metabolic consequences of inadequate O₂ delivery and/or O₂ utilization, and/or related topics covered in class. The term paper, which likely will be an extension of your major class presentation, should reflect the physiological “mechanisms” and “control” aspects of your topic. However, within these broad guidelines, the specific topic chosen can be one that is relevant to your graduate research project and/or a topic in which you would like to gain a better understanding.

As part of the course assignment you will be required to make a 25-30 min presentation based on your topic. The term paper will be handed in approximately 1-2 weeks after the presentation date. Students are expected to contribute to the discussion for each of the presentations, ask questions and to provide feedback on the presentation.

Major presentation - 20% of final grade (subject to modification as discussed in class)
Major term paper - 20% of final grade (subject to modification as discussed in class)

The final research paper should be formatted as follows (details subject to change each year):
- length not to exceed 10 pages (not including references, figures, tables, references (all appended at the end of the paper))
- typed, double-spaced; - Times New Roman font, with 12 pt font size
- margins (top, bottom, sides) should be 2.54 cm