



# HPHY 676

## Human Cardiovascular Control

**Instructor:** Dr. Christopher Minson

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**Office Hours:** By appointment. Please see instructions on the Blackboard site

**Objectives:** To gain an understanding of cardiovascular physiology at the Doctoral-Level including blood pressure regulation, regulation of blood flow distribution during rest and dynamic exercise, and central control mechanisms. The course is a true "integrative physiology" course, i.e., we will view the cardiovascular system in the context of how it relates to other systems and how changes in regulation of another system can impact cardiovascular control. Throughout the course, you will be expected to become familiar with the other physiological systems discussed. You will need to rely not only on your knowledge of the specific mechanisms we study, but the actual experiments, including the strengths and weaknesses of the model used, that have allowed us to learn the mechanisms of control. You will be evaluated on your ability to discuss/argue the concepts and experimental data and you must be able to demonstrate the integration of theory and practice.

**Class meeting Times:** The class will meet as scheduled Tuesday and Thursday from 10-11:20 in McKenzie 345.

**(Mandatory text)** *Human Cardiovascular Control-Rowell*. You will be responsible for having read the assigned material before it is discussed in class!

**(Optional text)** A graduate level physiology textbook such as *Medical Physiology (Guyton and Hall)* or *Physiology (Berne and Levy)* is highly recommended. Material from the first section will be found in these textbooks so it is to your advantage to read the relevant sections. I may also provide you with several papers to read and summarize.

**Remedial material:** This is a graduate physiology course and I will assume that you have a strong understanding of cardiac and circulatory control. If

you are having trouble understanding the basics, contact me about additional background material and plan on spending a significant amount of time reviewing this material. ***Make sure you stay on top of the material!!***

**Evaluation:** Starting the second week of classes, there will be periodic chapter summaries or graph descriptions due. We will discuss your answers in class, but you will not receive points for them. There will be an oral final exam. If you pass the oral exam, you will receive an "A" in the class. If you do not pass the oral exam, I will give you a second chance and if you pass you will get a "B". If you do not pass, you will receive a "C" in the class. During the quarter, we will have regular discussions on your performance in the class. If you are not performing up to my expectations, I will give you additional readings/assignments to help you. It will be up to you to do the work. If you are not showing progress, I may recommend you drop the class before the Drop deadline. The individual ORAL Final Exams are scheduled on Friday June 10<sup>th</sup>.

**THE FOLLOWING IS A LIST OF THE PRIMARY TOPICS FROM THE CHAPTERS WE WILL COVER:**

1. Passive Effects of Gravity
2. Reflex Control during Orthostasis
3. Neural-Humoral Adjustments to Orthostasis
4. Orthostatic Intolerance
5. Central Circulatory Adjustments to Dynamic Exercise
6. Control of Regional Blood Flow during Dynamic Exercise
7. Control of Blood Flow to Dynamically Active Muscles
8. Cardiovascular Adjustments to Isometric Contractions
9. Limitations to Oxygen Uptake During Dynamic Exercise
10. Role of Central Command
11. What Signals Govern the Cardiovascular Responses to Exercise?  
Reflexes from Active Muscles
12. Arterial Baroreflexes, Central Command, and Muscle  
Chemoreflexes (metaboreflexes): A Synthesis