

# Quantitative Human Systems Physiology

*Last updated: 3/10/2014*

## Author Information

**Dr. Bradley Sutton**  
University of Illinois at Urbana-Champaign

## Course Details

### Description

Engineers and non-engineering students have traditionally learned human physiology through absorption of information and behavior concepts. This results in being able to describe the particular relationships that were examined. However, the material presented in that form limits the student's ability to retain that knowledge or extrapolate it to new systems of physiology. Instead, we focus on creating an appreciation for the basic conservation principles that lead to simple, but quantitative, mathematical models of physiological behavior. Understanding of these principles creates an enduring understanding of the physiology and enables extrapolation.

In addition, simulation models allow for hundreds of experiments to be virtually performed by students to create a quantitative feel for the behavior of a system. This must be tied to several real experiments to validate the models and demonstrate the measurement of input parameters to the models. We utilize MATLAB and Simulink to generate computer models for differing physiological systems. Experimental procedures are performed with the BIOPAC system, and data analysis is done in MATLAB.

### Original Course Documents

[Source file URL](#)

## Course Contents

### Module 1

- [Cardiovascular Model Documentation](#)
- [Cardiovascular Simulink Model](#)

### Module 2

- [Muscle Dynamics Documentation](#)
- [Muscle Dynamics Simulink Model](#)

### Module 3

- [Neurophysiology Hodgkin Huxley Documentation](#)
- [Neurophysiology Hodgkin Huxley Simulink Model](#)



This work is licensed under a [Creative Commons Attribution-ShareAlike 3.0 Unported License](https://creativecommons.org/licenses/by-sa/3.0/).  
Learn more about MathWorks academic resources:

- [MATLAB Courseware](#)
- [Hardware Resources](#)
- [Classroom Resources](#)
- [MATLAB Examples](#)
- [Books](#)
- [Tutorials](#)
- [Webinars](#)
- [Technical Articles](#)