

Bioengineering 3202, Human Physiology II  
Spring Semester, 2006  
Cardiovascular Physiology

Rob MacLeod

April 4, 2006

**Description**

This is the (constantly) revised syllabus from the section of BE 3202, Physiology II, which deals with the cardiovascular system. This material provides an overview of systems physiology with special emphasis on engineering aspects of the mechanisms involved.

This version is based on discussion in the first lecture to determine topics of common interest in the class and it will evolve as we go through the material.

**Class time and venue**

Class times: Monday, Wednesday, Friday: 9:40–10:30 am  
Classroom: MEB 2325  
Lab times: Monday and Wednesday: 2:00–5:30  
Lab room: MEB 1480

**Instructors**

Name	Phone	Email	Office	Office Hours
Rob MacLeod	587-9511	macleod@cvrti.utah.edu	3476 MEB	After Friday classes and by appointment
Alex Brownell (TA)		aabrownell@yahoo.com	MEB	By appointment
David J. Warren		david.warren@utah.edu	BPRB	By appointment

**Text and resource materials**

**Human Physiology: an Integrated Approach** , Third Edition by D.U. Silverthorn, Prentice Hall, 2004.

**Notes:** ([www.cvrtil.utah.edu/~macleod/be3202](http://www.cvrtil.utah.edu/~macleod/be3202)).

**Learning objectives**

To produce students and future engineers who:

- Have fundamental knowledge of physiological system function and dysfunction

- Can analyze physiological systems from an engineering perspective
- Have the ability to formulate practical engineering solutions to ameliorate biological disorders
- Understand how solutions manifested in biological systems may potentially be applied to the solution of traditional engineering problems through a bio-based approach
- Appreciate the ability of bioengineering to improve the quality of life
- Recognize the ethical issues associated with testing and implementation of biomedical devices and treatments
- Understand the need for life-long learning to maintain and enhance their technical skills, and to stay abreast of advances in understanding

## Grading

Grading for the whole course will be based on a combination of exams and homework assignments as follows:

**Exams:** 2 midterms and a final exam, worth a total of 75% of the total grade. All the material from this, the cardiovascular section of the course, will be in the final exam.

**Laboratory and homework assignments:** lab reports and participation in the lab exercises, homeworks as assigned throughout the semester and worth a total of (25)% of the final grade

## Lectures and Reading Material

#	Date	Topic	Reading*
CV-1	March 1	Overview, topic selection, Lab background	Notes
CV-2	March 3	Overview of the cardiovascular system	14:448–451
CV-3	March 6	EC coupling and contraction of the heart	12:391–403, 14:460–464
Lab-1	March 6/8	Frog 1: structure and Frank Starling Mechanism	
CV-4	March 8	Cellular electrophysiology/pacemakers	14:464–466, 470
CV-5	March 10	Cardiac mechanics and the heart cycle	14:458–459, 474–479
<b>March 13–17, March Break</b>			
CV-6	March 20	Regulation of heart rate and contraction	14:466–468, 480–482
Lab-2	March 20/22	Frog 2: function and regulation	
CV-7	March 22	Frog heart and Hemodynmiacs	14:451–455
CV-8	March 24	Discussion of lab reports and scientific writing	Notes
CV-9	March 27	Tissue electrophysiology: cell to cell coupling and spread of excitation	14:468–470
CV-10	March 29	Conduction system and the volume conductor	14:468–470
CV-11	March 31	Spread of excitation and bioelectric sources	Notes
CV-12	April 3	The electrocardiogram	14:471–476
Lab-3	April 3/5	ECG, Blood Pressure, and Exercise	
CV-13	April 5	Blood pressure	15:494–498, 510–512
	April 7	<b>Midterm #2</b>	All of Chapter 14
CV-14	April 10	CAD, ischemia, and hypertrophy	15:512–516

\* Chapter:page numbers from Silverthorn.