

PHY 3250, Biological Physics
4 Credit Hours
Fall 2020

Instructor: Eugene Surdutovich**E-mail:** surdutov@oakland.edu**Office:** 172 Hannah Hall**Office phone:** 248-370-3409**Class meets:** MWF 9:20 – 10:27am @ 190 HH**Office hours:** MWF 10:30-11:30 pm**Text:** *Intermediate Physics for Medicine and Biology, 5th Edition*, by Hobbie & Roth.

An electronic version of the textbook is available through the OU library.

Book Website: <https://sites.google.com/view/hobbieroth/home> (get the errata!).Book Blog: <http://hobbieroth.blogspot.com>**Grading:** I will give you the better of the following two scores in the table on the left below:

Exam 1		25%	15%
Exam 2		25%	25%
Final Exam		30%	40%
Homework		20%	20%
Total		100%	100%

A	96-100
A-	90-95
B+	85-89
B	80-84
B-	75-79
C+	70-74
C	65-69
C-	60-64
D+	55-59
D	50-54
F	< 50

Grading Scale:**Goals**

To appreciate how fundamental physics laws work in biological systems.

We will go through the applications of mechanics, fluid statics and dynamics to understand the function and malfunction of different organs of mammal organisms. We will discuss different types of transport realized in biological systems. We will review the electromagnetic phenomena and see their applications to biological systems.

To understand the propagation of signals in nerves and muscle cells

To appreciate how one particular differential equation is so ubiquitous in explaining of how biological system work

A number of effects culminating at feedback will be discussed in this course.

Week	Day	Date	Lecture Topics	Chapters
1	F	9/4	Introduction, Mechanics	1
2	M	9/7	Labor Day	
	W	9/9	Mechanics continued	1
	F	9/11	Fluid Dynamics	1
3	M	9/14	Fluid Dynamics	1
	W	9/16	Fluid Dynamics	1
	F	9/18	Exponential growth, Scaling	2
4	M	9/21	Continued	2
	W	9/23	Continued	2
	F	9/25	Thermodynamics	3
5	M	9/28	Continued	3
	W	9/30	Continued	3
	F	10/2	Exam 1	
6	M	10/5	Transport, Diffusion	4
	W	10/7	Continued	4
	F	10/9	Osmotic Pressure	5
7	M	10/12	Continued	5
	W	10/14	Continued	5
	F	10/16	Electricity and Nerves	6
8	M	10/19	Continued	6
	W	10/21	Continued	6
	F	10/23	Hodgkin & Huxley Model	6
9	M	10/26	Continued	6
	W	10/28	Exam 2	
	F	10/30	Extracellular Potentials	7
10	M	11/2	Continued	7
	W	11/4	Continued	7
	F	11/6	The Heart, ECG	7
11	M	11/9	Continued	7
	W	11/11	Continued	7
	F	11/13	Biomagnetism	8
12	M	11/16	Continued	8
	W	11/18	Continued	8
	F	11/20	Heart Arrhythmias, Chaos	10
13	M	11/23	Continued	10
	W	11/25	Continued	10
	F	11/27	Thanksgiving recess, no class	
14	M	11/30	Feedback	10
	W	12/2	Feedback, continued	10
	F	12/4	Feedback, continued	10
15	M	12/7	Conclusion, review	
16	M	12/14	8-11 a.m. Final Exam	