

HUMAN PHYSIOLOGY LAB

BIPN 105 (Winter, 2024)

INSTRUCTOR:

Chris Armour, M.D., Ph.D.

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Office Hours: Mondays 12:00 - 12:50

York Hall 2426

INSTRUCTIONAL ASSISTANTS:

Tim Heil

Mihali Dieguez

Patrick Zaccaria

Ryan Ghassemi

STAFF RESEARCH ASSOCIATE:

The purpose of this course is to provide experience with some of the experimental methods of physiology, help students obtain a better understanding of the principles of physiology, and learn how to communicate science in a professional manner. This course is a companion to BIPN 100 (and BIPN 100 is a prerequisite).

There are two lectures per week. Some lectures will be live (PODEM 1A19 M/W 12:00 - 12:50 p.m.) and some will be pre-recorded (see schedule). Live problem-solving sessions will be held on Fridays (PODEM 1A19 12:00 - 12:50 p.m.). There are also two laboratory sessions per week (York 2426, M/W 1:00 - 5:50 p.m. or Tu/Th 12:30 - 5:20 p.m.).

The experiments will be written up in three lab reports. The first two lab reports will be written individually and each report covers two experiments. The final lab report covers a group project and will be written by the lab group. At the end of the quarter, each lab group will present a short symposium on their project. Homeworks and a comprehensive final will be given.

lab reports: #1 and #2 - each 20% of course grade

#3 - 15% of course grade (all lab reports must be completed to pass)

All lab reports must be submitted to Turnitin.com in order to receive a grade in this course

symposium: 5% of course grade (participation is required to pass)

final/homeworks: 40% of course grade

REQUIRED MATERIALS

- Lab manual (UCSD Bookstore)
- Text: Human Physiology, Silverthorn, 8th edition (digital access available through Canvas)
- Schedule/course information/problem sets (Canvas)
- USB flash drive
- Safety glasses

BIPN 105 SCHEDULE (Winter, 2024)

<u>DATES</u>	<u>ACTIVITY</u>	<u>TOPIC</u>	<u>READING</u> (Lab Manual/Silverthorn 8 th ed.)
Jan. 8	Lecture (live)	Biophysical Instrumentation	Introduction
Jan. 8, 9	Lab	Introduction to Instrumentation	#1
Jan. 10	Lecture (live)	RBC Membrane, Osmosis	124-127
Jan. 10, 11	Lab	Properties of RBC Membranes	#2
Jan. 12	Problem Solving (live)	Equipment and RBCs	Problem Set #1
Jan. 15, 16		MLK Holiday (no lecture or lab)	
Jan. 17 (Wednesday)		HMK #1 - RBC Lab (experiment #2) due (York 2426 12:00 - 1:00)	
Jan. 17	Lecture (recorded)	Basis/Propagation of Action Potentials	152-158, 224-249
Jan. 17, 18	Lab	Sciatic Nerve Studies in the Frog	#3
Jan. 22	Lecture (recorded)	Neuromuscular Transmission	249-257
Jan. 22, 23	Lab	Neuromuscular Studies in the Frog	#4
Jan. 24	Lecture (live)	Lab Reports	
Jan. 24, 25	Lab	Repeat Day	
Jan. 26	Problem Solving (live)	Sciatic Nerve and NMJ	Problem Set #2
Jan. 29	Lecture (recorded)	Skeletal Muscle Physiology	376-396
Jan. 29, 30	Lab	Muscle Studies in the Frog	#5
Jan. 31 (Wednesday)		Report #1 part 1 (Sciatic Nerve - exp. #3) due (York 2426 12:00 - 1:00)	
Jan. 31	Lecture (recorded)	Smooth Muscle Physiology	400-409
Jan. 31/Feb. 1	Lab	Rat Uterus Preparation	#6
Feb. 2	Problem Solving (live)	Skeletal and Smooth Muscle	Problem Set #3
Feb. 5 (Monday)		HMK #2 - Muscle Lab (experiment #5) due (York 2426 12:00 - 1:00)	
Feb. 5 (Monday)		Report #1 part 2 (NMJ - exp. #4) due (York 2426 12:00 - 1:00)	
Feb. 5	Lecture (recorded)	Cardiac Biomechanics	440-445, 459-471
Feb. 5, 6	Lab	Starling's Law Video	#7
Feb. 7	Lecture (recorded)	Cardiac Electrophysiology	446-459
Feb. 7, 8	Lab	Cardiac Physiology in the Frog	#8

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<u>DATES</u>	<u>ACTIVITY</u>	<u>TOPIC</u>	<u>READING</u> (Lab Manual/Silverthorn 8 th ed.)
February 12 (Monday)		HMK #3 - Uterus Lab (experiment #6) due (York 2426 12:00 - 1:00)	
Feb. 12	Lecture (recorded)	Fluid Balance, Edema, and Blood Flow	477-480, 495-500
Feb. 12, 13	Lab	Hemodynamics in the Frog	#9
Feb. 14	Lecture (live)	Student Projects Explanation/Sign-ups	
Feb. 14, 15	Lab	Repeat Day	
Feb. 16	Problem Solving (live)	PV loop, Frog ECG, Fluid Balance	Problem Set #4
Feb. 19, 20		President's Day Holiday (no lecture or lab)	
Feb. 21 (Wednesday)		Report #2 part 1 (Cardiac - exp. #8) due (York 2426 12:00 - 1:00)	
Feb. 21	Lecture (recorded)	Principles of Electrocardiography	455-459
Feb. 21, 22	Lab	Human Electrocardiogram	#10
Feb. 26 (Monday)		Report #2 part 2 (Fluid Balance - exp. #9) due (York 2426 12:00 - 1:00)	
Feb. 26	Lecture (recorded)	Non-invasive Cardiac Evaluation	481-483
Feb. 26, 27	Lab	Monitoring Circulation in Humans	#11
Feb. 26, 27 (Monday/Tuesday)		Discuss Student Projects in Lab - one page summary due	
Feb. 28, 29	Lab	Student Projects	#12
March 1	Problem Solving (live)	Human ECG, Heart Sounds, Murmurs	Problem Set #5
March 4, 5	Lab	Student Project Repeat Day #1	
March 6, 7	Lab	Student Project Repeat Day #2	
March 11	Lecture (recorded)	Renal Physiology	131-151, 588-606
March 11, 12	Lab	Human Kidney Function	#13
March 13, 14		STUDENT SYMPOSIUM	
		Report #3 (Student Project - exp. #12) due at symposium	
March 15	Problem Solving (live)	Kidney and Student Projects	Problem Set #6
Exam Week		FINAL EXAM	
		Wednesday March 20 11:30 – 2:30	
		location: TBA (probably PODEM 1A19)	

The schedule and format of this course may change (including switching to online assignments or canceling the final exam) to accommodate COVID restrictions or other unforeseen circumstances