

Systems Physiology Laboratory (01:146:357)

Course URL: <https://rutgers.instructure.com/courses93473>

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COVID-19 Pandemic---This disease has forced us to move away from in-person, hands-on experimental education, to remote learning. We apologize for this. Your experience in this course will depend, in part, on your adaptability. We will learn from experiments that have been conducted in-person at Rutgers University for more than 43 years. The experiments will not be performed in an experimental teaching physiology laboratory (i.e. room B-137, Nelson Labs, Busch Campus). Instead, they will be taught using **Lt/kuraCloud**, an online learning platform provided by ADInstruments, Colorado Springs, CO. **Prior to the beginning of the Fall Semester, students will receive an email invitation from Lt/kuracloud to create an account to have access to virtual lab lessons.** In-person lab sections typically meet Mon-Fri beginning at 8:40 a.m. and 1:40 and 6:40 p.m. Your instruction will be presented 'on-line and synchronously' (real time, online mini-lectures will be presented by your TA at the designated start time, 8:40, 1:40 or 6:40, for your class. Students will then complete virtual labs on Lt during the allotted 3 hour time period).

Course Description

Physiology is an experimental, analytical, quantitative science. "The study of physiology is only half accomplished if you never enter the laboratory. It is one thing to hear a concept explained in lecture, but quite another to see the concept unfold before your eyes in a laboratory experiment." (Gerald D. Tharp, University of Nebraska). Systems Physiology Laboratory was designed by Gary F. Merrill to teach students classic, experimental, organ systems physiology. Laboratory experiments are performed in isolated organ preparations (e.g. skeletal muscle, sciatic nerve, heart), in whole animals that are anesthetized/euthanized (in situ experimentation), and in student subjects. Our laboratory classes meet once a week. The focus of each week's activity is hands-on experimentation rooted in classic vertebrate physiology.

Learning goals of this course include but are not limited to:

- * Educating students in the basics of research in organ systems physiology
- * Increasing the student's basic laboratory skills (thinking, designing, performing live experiments)
- * Exposing students to the use of "state-of-the-art" data acquisition equipment
- * Conducting experiments that demonstrate fundamental physiological principles (including the use of physiological transducers)

* Teaching students the proper techniques of scientific writing/reporting

Our experiments Include: * Introduction to Data Acquisition and LabChart (Lt cloud-based experiments when meeting remotely, e.g. S/F2020), Software Lab Experimental Design, * Striated Skeletal Muscle and Nerve-muscle Experiments,* Regulation of Blood Pressure, * Interpretation of ECGs in Humans and Other Vertebrates, * Respiration and Spirometry, * Osmolarity and Water Balance (Kidneys), * Blood Glucose and Insulin, * Gastrointestinal Function, etc.

Physiology Laboratory (01:146:357) **LABORATORY SAFETY GUIDELINES**

Dear Students: The Covid pandemic has forced us to meet remotely F2020. If meeting in person (room B-137, Nelson Labs, Busch Campus) we would want you to practice the following policies for your safety and the safety of your lab partners.

1. Become familiar with the location of all building/laboratory exits.
2. Know the location of laboratory safety equipment: first aid kit, fire extinguishers, eyewashes, and safety showers.
3. Wear personal protective gear where laboratory or experimental conditions dictate: laboratory aprons, lab coats, gloves, goggles are available for all students.
4. Wear clothes that protect the body against chemical spills, dropped objects, and other accidental contact. Thus, bare midriffs, shorts, open-toed shoes, sandals, and high heels are prohibited in the laboratory.
5. Eating and drinking are not permitted in the laboratory except when dictated by experimental protocol.
6. If body fluids are being studied, work only with your own. Precautions to prevent contact with body fluids may include wearing safety glasses, gloves, aprons, etc.
7. All disposable supplies that come in contact with body fluids must be discarded into appropriately marked containers for disposal.
8. Animal remains must be discarded into carcass bags for proper disposal.
9. Many of the experiments require students to serve as subjects. If you have, or have had any of the following conditions, please do not volunteer as a subject, for example chronic or acute respiratory infections: do not breathe into spirometers in respiratory experiment, cardiovascular disease (high blood pressure/hypertension, angina, etc.) do not perform stressful exercise in ECG experiment.
10. Before you exit the laboratory, wash your hands thoroughly.

2021 SPRING SEMESTER

Prior to the first class please complete 'Welcome to Systems Physiology Laboratory and Lt'
(see Lt kuraCloud platform)

Lab #	Dates	Experiment	Written Assignment Due (excluding quizzes and TA eval point items)
Lab #1	1/25 – 1/29	Intro to Lab Chart	
Lab #2	2/1 – 2/5	Blood Pressure	
	2/8 – 2/12	Human Heart	Introduction (Blood Pressure)
Lab #3	2/15 – 2/19	LECTURE EXAM (2/16) No labs	
Lab #4	2/22 – 2/26	Frog Heart	Methods (Human Heart)
Lab #5	3/1 – 3/5	Blood Glucose	Discussion (Frog Heart)
	3/8 – 3/12	LECTURE EXAM (3/11) No labs	
	3/15 – 3/19	SPRING BREAK	
Lab #6	3/22 – 3/26	Spirometry	Results (Blood Glucose)
Lab #7	3/29 – 4/2	Kidney/Water Balance	
Lab #8	4/5 – 4/9	Frog Nerve	Abstract (Kidney/Water Balance)
Lab #9	4/12 – 4/16	Frog Muscle	Final Report (Frog Nerve)
	4/19 – 4/23	LECTURE EXAM (4/20) No labs	
Lab #10	4/26 – 4\30	Human Muscle	

Course Activities and Assessment

- **In August, students will receive email invitations to create a student account with Lt/kuraCloud.**
- **Prior to the first class, students must accept the invitation, create an account, and complete the “Welcome to Systems Physiology Laboratory and Lt” lesson in Lt/kuracloud.**
- **In subsequent weeks, students will be expected to complete the Pre-lab and Quiz for each exercise before their synchronous lab class.**

Pre-lab and Quiz: For Lab #1 only, students will complete the Pre-Lab and Quiz as well as the experimental lesson following their mini-lecture. Starting with Lab #2, students will be expected to complete the Pre-lab and Quiz for each exercise before their synchronous lab class <https://accounts.kuracloud.com/user/login>.

Lecture Modules: Online mini-lectures will be given synchronously in the first 30 minutes of each class.

Virtual Labs: Following each mini-lecture, students will access virtual lab experiments through the Lt/kuracloud online learning platform <https://accounts.kuracloud.com/user/login>. Virtual experiments must be completed during the 3 hour time period allotted for their class.

TA Evaluation: TA evaluation points will be earned based on lab participation and completion of tables, graphs and “Check your understanding questions” that are part of each lab exercise.

Lab Reports: Writing assignments will accompany several of the experiments. These will include partial and complete lab reports.

Grading Policy

TA Evaluation (40, 4pts x 10); Weekly Quizzes (50, 5pts x 10); Writing Assignments (60, 10pts x 3, Intro, Methods, Abstract; 15pts x 2, Results, Discussion); Final Lab Report (60, 60pts x 1 Full Report);
TOTAL POINTS = 210

Plagiarism – One must do his/her own work when writing reports in System Physiology Laboratory. It is permissible to use short excerpts/quotes from the work of others; however, in any single report, these should be few and short. In all cases where the work of others is cited, credit must be given. When citing, avoid using the same exact words as an author or paraphrasing large segments of writing. Read the information and explain it in your own words. Do not cite Canvas material, lecture notes, manuals, or TAs. Please use the format given to you by your TA when citing textbooks and journal articles in your reports. For instance, if your TA asks you to use APS (American Physiological Society) formatting, be sure to locate a credible source that can guide you with the citation process.

Academic Integrity Policy:

<http://academicintegrity.rutgers.edu/academic-integrity-policy>