

Biology 350: Animal Physiology - Sections 1-4 Spring 2019

Course Instructor: Robin Cooper.
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Office Hours: By appointment (*appointments made by email only*)

Class Time and Location: Tu & Thur 9:30 -10:45 AM 116 TH Morgan Building

Faculty Lab Coordinator: Melody Danley, Ph.D.: mlda227@uky.edu

Lab Times and Location: Jacob Science Building – Room 104

Section 001 LAB M 3:00 pm - 5:50 pm
Section 002 LAB Tu 12:00 pm - 2:50 pm
Section 003 LAB W 9:00 am - 11:50 am
Section 004 LAB W 12:00 pm - 2:50 pm

Laboratory Teaching Assistants:

Lab Instructor: Dr. Jennifer Rodriguez-Rivera jennifer.rodriguez-rivera@uky.edu
Lab TA: Ms. Bookie Omotola bukola.omotola@uky.edu
Lab TA: Ms. Tori Thompson tori.thompson@uky.edu
Lab TA: Ms. Alex Stanback alexandra.elizabeth@uky.edu

YOU MUST ATTEND CLASS/LAB AND TAKE ALL EXAMS AND ASSIGNMENTS WITH THE SECTION IN WHICH YOU ARE OFFICIALLY REGISTERED. Credit will only be awarded for activities completed with the section in which you are officially registered.

Course Pre-requisites: strongly recommended BIO 304 or BIO 315 but not required

Textbooks (Texts are learning resources; none are required but all strongly recommended):

1. *Animal Physiology: From Genes to Organisms* ©2005 | Thomson & Brooks/Cole ISBN 0534554040. Sherwood, Klandorf and Yancy.
2. *Animal Physiology: Mechanisms and Adaptations* ©2002 W.H. Freeman & Co. ISBN 0-7167-3863-5 (cloth). Eckert, Randall, Burggren, French. (many class slides come from this text) (**Preferred Text**)
3. *Animal Physiology* ©2008 Sinauer and Associates. ISBN 978-0-80893-317-4. Hill, Wyse & Anderson.
4. *Human Physiology* ©2004 Pearson/Benjamin Cummings. ISBN 0-8053-5957-5. Silverthorn.

CLASS WEB PAGE:

<http://web.as.uky.edu/Biology/faculty/cooper/Bio350-Spring2019/TEACHING350spring2019.htm>

Course Description / Overview

This course in animal physiology will take an integrative approach in presenting the subject matter. This means that we will consider the entire animal when discussing a particular physiological system (e.g. the complete cardiovascular system during exercise or neurological control of muscle movement). There are three major ingredients that are required of students for success in this course; 1) Completion of textbook and study of supplemental material prior to attending each class. Reading and learning of factual information is required prior to comprehension and understanding of course problems and activities. The course will be taught in a mixed “flipped” and didactic manner. In other words, you will be **REQUIRED** to learn material prior to coming to class. 2) Effective written communication of laboratory and case study results, data analysis from problems in class and laboratory and drawing of appropriate conclusions from data utilizing the knowledge learned in class, text reading and use of outside supplemental materials. This will fit very well in preparation of the course with the “flipped” curriculum structure, 3) Students engaging themselves in the classroom and laboratory throughout the semester. It is through student engagement that develops depth of knowledge and understanding that will lead to success on summative evaluations. This aspect will become more obvious once we begin to engage in the teaching and learning aspect of the course.

The laboratory component of the course is a major portion of the fundamental learning of all concepts in Animal Physiology. The lab component of BIO 350 provides upper level GCCR writing credit as part of the UK Core. The course has been designed to assure that the lab and classroom material are closely aligned and to help you meet the course learning objectives. Each laboratory lasts a maximum of 3 hours. *The lab sessions are not a separate part of the course*; rather they are an essential component for the learning and application of classroom concepts. The objective of lab sessions is for you to ask questions about any material that you do not understand. Written laboratory reports of varying length will be assigned for each lab and you must submit your completed work through appropriate links on Canvas by the deadline for each assignment. Your teaching assistants are at these lab sessions for instruction and to assist in your learning; however, if you do not prepare yourself by reading and trying to understand the course material prior to coming to lab they will not be able to help. Teaching assistants need feedback at these sessions; they are not there to lecture and add new material. They are there to help you understand the material and apply the physiological concepts to real-world problems; therefore you must know before you arrive what you do not understand. Attendance will be taken at each lab session. If you do not attend your assigned laboratory session, you will not be able to complete the associated question sets. Submission of work by absentee students is not accepted, and if attempted, the student will earn an automatic zero on this assignment. Dr. Melody Danley is the laboratory coordinator for BIO 350.

The fraction of the overall grade for the course completed during the laboratory sessions and assignments is significant. These labs will not only assist you in understanding the course content but will also greatly aid in your performance on the course summative assessments (i.e. exams). Therefore, students will be required to think critically, express themselves orally and in written form, and provide provocative and intellectual discussion to the data and topics that are presented in both the classroom and laboratory learning environments. Each of you may or may not choose to become professional physiologists in the future. Thus, the goal in this course is for you to retain knowledge of the basic fundamental concepts of animal physiology which you can apply in any future endeavor in the biological sciences.

Course Objectives/Goals

Students should emerge from the course with a firm foundation in:

- 1) A fundamental understanding of the nature of animal physiology as a discipline.
- 2) How the scientific and experimental process is used to develop fundamental physiological knowledge about animal functions.
- 3) Understand how all organisms across the animal kingdom utilize similar and different physiological functions as adaptations to their existence within the natural environment.

As a means toward that end, it is often necessary to learn certain terms, and basic anatomical/physiological details. Knowing these terms and the anatomy is useful, but not as important as understanding the concepts. Terms, anatomy and fundamental informational content is only a means to an end, not an end goal in and of itself.

The end goal instead is to understand how different organisms use similar and different physiological methods as a means towards homeostatic regulation of their internal and external *milieu*.

Learning Outcomes:

By the completion of the course the student should be able to:

- 1) Explain how biological feedback control systems function within the context of maintaining organismal internal and external homeostasis throughout the animal kingdom.
- 2) Understand the major functional processes of internal animal functions of the neural, muscular, endocrine, reproductive, cardiovascular, renal, respiratory and digestive systems.
- 3) Explain how these basic body functional systems work together and cooperatively in the maintenance of overall organismal homeostasis. For example these integrative processes would include but are not limited to regulation of energy balance, thermoregulation and body functions during exercise.
- 4) Derive an effective testable hypothesis and provide a reasonable experimental design that will directly test that hypothesis.
- 5) Understand how to identify the key data in an experiment and apply those findings to develop a logical and credible conclusion in regard to a physiological function among different animal species.
- 6) Understand and explain how specific physiological adaptations to changing environmental conditions, assist different species of organisms in their survival and understand how these adaptations are specific to behaviors and organismal propagation of the species' existence.

Disabilities/ Medical Conditions: If you have a documented disability that requires academic accommodations, please see me as soon as possible (before quizzes and exams start, within 2 weeks of starting the class). In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Please contact the DRC, located on the Fourth Floor of the MDS Building, 257-2754) for coordination of campus disability services available to students with disabilities.

Attendance:

You are expected to attend all classes and scheduled labs. **Much of the lecture/classroom material is not in the textbook. In addition, all lectures are considered recitation/discussion/interactive learning sessions. ALL lab material will be fully incorporated into the "lecture or classroom period". This is a single course of Classroom + Laboratory Learning Experiences.** If you miss a class or lab, it is your responsibility to get any information, assignments, etc. missed. Contact other students in class before seeing me for help. Any and all class materials will be available and may be obtained on Canvas and on class web page; however, the timing of the uploading of these materials is at the discretion of the instructors.

Rescheduling Excused Exams or Laboratory Exercises:

Lab attendance and participation is mandatory for this course. Attendance will be taken every lab by the TA's. It is your (the student's) responsibility to ensure you sign-in each week with your TA, complete all activities, clean-up your workstation, and submit all necessary work to receive credit associated with any lab assignments. Students can also lose up to 5 points per lab for failing to participate during the lab, clean-up after the lab, leaving before the lab activity is finished, or for demonstrating inappropriate behavior during lab, at the discretion of the laboratory instructor (Dr. Danley) or lab TA.

Students with documented, excusable absences are allowed to make up missed exams or lab activities according to the following guidelines: For excused non-emergencies, students must notify the instructor at least 1 week (7 days) before the excused absence. For lab related absences, the student must notify Dr. Danley at least 7 days in advance of the absence. Only students with excused, documented absences are eligible to make-up labs. Make-up labs are typically scheduled for Friday morning of the same week during the excused absence/missed lab, by appointment only. After this point, the lab materials will be stored and it may not be possible to make-up the lab.

For emergency-related absences, students must notify the lecture or lab instructor no later than 4 hours after the missed exam or lab. Acceptable documentation must be submitted no later than 3 days, after missed

assignment/exam. Excused, missed work must be completed within one week (7 days) of the original scheduled due date, unless other arrangements have been made with the TA/instructor. In all cases, you must present a physician's note (as outlined above) to the instructors within 3 calendar days of missing any exam.

Course Policy on Classroom Civility and Decorum:

The university, college and department all have a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time-to-time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right -- and the responsibility -- to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility includes attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such factors.

Reading Assignments:

Reading assignments and supplemental materials are listed on the lecture outline and posted on Canvas with each unit. These assignments must be read before coming to class. **All assigned readings and supplemental class material (websites, extra slides, videos) are presented as aids to your learning and achieving the objectives of the course. Thus, this material is considered potential exam material whether specifically covered in class or not.**

Grading:

Exam 1	80 points
Exam 2	100 points
Final Exam	150 points
Lecture assignments & quizzes	80 points
Lab Question Sets	80 points
GCCR Reports	120 points
Online lab quizzes (8 x 2 points)	<u>16 points</u>
	626points total

Final grades will be based on total points earned and will be assigned as follows:

- A = 564 - 626 points
- B = 501 - 563 points
- C = 438 - 500 points
- D = 375 - 437 points
- E = less than 374 points

Important Course NOTES:

- There will be **no extra credit**.
- There is **no curving** of any grades in this course for any reason. Thus, all students have the **full** opportunity to earn the grade of A.

First day of classes	January 9
Last day to add a class	January 15
Last day to drop without a W or change grading option	January 30
Midterm	March 4
Spring Break	March 11-16
Finals Week	April 29-May 3

Examinations

Exam dates are listed in the course scope and sequence below. Exams 1 and 2 and the final exam may consist of multiple choice questions (with data interpretation), data interpretation questions expressed as short answer and/or fill in the blank questions. **Physiology concepts build upon one another and therefore, all exams will be cumulative from beginning to end of the course. In other words, concepts learned in all previous exams will be required for conceptual understanding of current exams.** The final exam will consist of 160 points on material covered in the entire course. You must bring a pencil and UK Student I.D. to the examinations. **YOU MAY NOT BE PERMITTED TO TAKE AN EXAMINATION IF YOU DO NOT HAVE YOUR UK ID WITH YOU AT THE TIME OF THE EXAMINATION.** Make-up exams will only be given for excused absences as defined by University Senate Rules V, 2.4.2. and will consist of short-answer and/or oral questions. Make-up exams will be administered at a single scheduled time or prearranged with instructor and students. A missed exam will result in a score of zero for that exam, unless an acceptable written excuse is presented **within one week of the absence or missed exam time.** Exam scores will be posted in the grade book on Canvas after exam 1 or 2, and after the final examination.

Exam Dates: Are shown in the course scope and sequence (see below).

YOU MUST TAKE ALL EXAMS WITH THE SECTION IN WHICH YOU ARE OFFICIALLY REGISTERED AND/OR ARE PARTICIPATING ON A DAILY BASIS. Credit will only be awarded for examinations completed with the section in which you are officially registered.

Any student with more than two final examinations scheduled on any one date is entitled to have the examination for the class with the highest catalog number rescheduled. The option to reschedule must be exercised **in writing** (via email) to the appropriate instructor **two weeks prior** to the scheduled examination. Exam scores will be posted in the grade book on Canvas after either exam 1 or 2.

Laboratory Assignments

There are eight lab exercises (nine sessions), which must be completed during the semester. The "manual" for the lab exercises is posted on Canvas. There is no separate lab manual to purchase. You will be responsible for printing out or having, in some means (computer/iPad, etc.), the protocol to use for each laboratory period. Hard copies are not provided. Lab sessions have three types of assignments: Online lab quizzes (pre-lab), lab question sets (end of lab), and GCCR lab reports (post-lab). All writing components must be submitted online through the assignment-specific links available on Canvas. A separate link will be made available for each assignment.

Online Lab Quizzes

Each lab exercise has a laboratory protocol associated with it. Prior to each lab session, an online quiz will be available for completion to ensure all students come to lab prepared. To prepare for the lab session and online quiz, you should read and understand the protocol that pertains to the laboratory exercises of that lab session. Lab Quizzes are available through 11:59 PM, the night before your scheduled lab session. So Monday sections, your online quizzes will be available through Sunday, 11:59 PM immediately before your lab session. Tuesday sections, your online quizzes will be available through Monday, 11:59 pm. Wednesday sections, your online quizzes will be available through Tuesday, 11:59 PM immediately before your lab session. Quizzes are worth 2 points each. They are deployed through Canvas. As with other scheduled assignments, once the deadline has passed, you will no longer be able to access the quiz. Be sure to give yourself plenty of time to take the quiz. You will receive points for all 8 quizzes (8 quizzes x 2 points each = 16 points total).

Scientific Writing/GCCR Assignments: As part of the course, students will learn how to identify and write up the major elements of biological research. Worksheet content includes identifying major experimental design elements, interpreting statistical analyses, summarizing results, and selecting proper visuals for results. Students will also practice organizing content when interpreting and discussing relevant of results. Students will also be assigned three larger writing assignments: (1) Introduction section, (2) Results and Discussion sections, and (3) a combined assignment (Full Lab Report) with all three sections. Each of these larger writing

assignments will be discussed in lecture and lab, and each will have written guidelines and sample papers available on Canvas. Additional materials for developing scientific writing skills are also available on Canvas.

These writing assignments within BIO 350 are also used to fulfill the GCCR writing requirement of the UK Core as follows:

1. **Lab worksheets:** practice identification of major experimental design elements as well as proper presentation of results, interpretation of statistical analyses, and interpretation of data.
2. **Introduction** section of a biological research topic (based on lab 1) = approx. 500 words, plus references. Opportunity for written feedback prior to final submission.
3. **Results and Discussion** sections of a biological research topic (based on lab 4) = approx. 500 words, plus figures and references. Opportunity for written feedback prior to final submission.
4. **Final Lab Report** (Introduction, Results, and Discussion sections based on lab 8) = approx. 1200 words plus figures and references. Opportunity for verbal feedback prior to final submission.

Lab Worksheets

During each lab session, question sets will be available to complete by each lab group. Lab groups are generally made up of 2 students that complete the lab activities together. Question sets must be completed by each lab group and uploaded into Canvas by 11:59 pm the day after the lab section meets. All members of the group will receive the same score. Only students that are physically present during the lab are eligible for the points associated with the lab question sets. Question set submissions for absentee students are only accepted after the make-up lab has been successfully completed. Make-up labs are only available to students with documented excused absences that follow the absentee policy. Question sets are worth 10 points per lab session.

GCCR Lab Reports

Each week, students will learn (via lecture and lab) how to write each of the components of a scientific paper (introduction, results and discussion sections). You will be writing 1-2 sections per report during this learning process. Then, during the final weeks of the course, students will write up the results of a lab experiment in the form of a complete scientific report (full lab report) that includes all sections covered during the semester. Reports are worth up to 120 points total (points vary by assignment). Only students that are physically present during the lab are eligible for the points associated with the GCCR reports.

REMEMBER: STUDENTS RECEIVING A GRADE OF C OR BETTER RECEIVE UPPER LEVEL WRITING CREDIT FOR BIO 350: ANIMAL PHYSIOLOGY. THESE WRITING ASSIGNMENTS AND GUIDANCE HAVE CLEAR LEARNING OBJECTIVES AND GOALS IN SCIENTIFIC WRITING.

WARNING: Once the deadline for submission of an assignment has passed, you will no longer be able to submit the assignment for a SCORE. The computer is very unforgiving – if you go past the deadline by even one second you will not receive a score for the assignment. The computer/software records the time of submission for the instructor. If you are unable to successfully submit your assignment through Safe Assign, it is your responsibility to email a copy of the report in MS Word format, to your TA BEFORE THE DEADLINE has passed. Late submissions through email will be deleted, and no credit will be awarded (does not apply to excused absences, as indicated below).

Problems associated with printers, computers, corrupted files, parking, traffic, library services, loss of wireless signal, computer labs, procrastination, over-sleeping or forgetfulness are not acceptable excuses for late submission of assignments. It is **YOUR** responsibility to make sure that assignments are submitted on time. If you leave submitting the assignment to the last minute and then get caught out by unexpected events – this is not considered an excused late submission. If you are participating in a university-approved event on a due date, then you must submit the assignment before you leave campus/start that activity.

Submission of late assignments will only be permitted for excused absences as defined by University Senate Rules V, 2.4.2. WRITTEN SUPPORTING DOCUMENTATION regarding the late submission of an

assignment MUST be presented to the course instructor within a week after a student returns to class after the excused absence otherwise an automatic score of zero will be earned for the assignment.

Additional Lab Guidelines

An essential component of learning in physiology requires the use of live animals. It is impossible to demonstrate the full extent of possible responses through textbook readings or lectures. As emerging professionals, it is expected that all students will demonstrate respect and maturity when working with these animals. If any disrespect or intentional cruelty is inflicted upon the animals, it may be reason to be expelled from the course with an "I" (incomplete), "W" (withdrawal), or automatic "E" (failing grade) depending the timing and degree of the offense.

No horse play, cutting up, playing around, etc. is allowed in the laboratory. There are many students coming and going in the lab throughout the day and materials are sometimes shuffled around. Squirting someone with a solution in a syringe or a bottle can be dangerous. You might "know" it is water but another person does not. A 3M KCl solution can easily be mistaken for water, and can be very harmful if squirted by accident in someone's eye.

Some people may have allergies to materials used in the lab. Materials lists are included for all laboratory exercises. If you know you are allergic to any materials being used during a particular exercise, please inform the lab instructor (Dr. Danley) as soon as possible so we can make alternative plans.

Every student is required to complete the online chemical hygiene and laboratory safety test before attending the first lab session. It is an easy test and you can take it multiple times until you get a 100 %. Students that have already completed the test within the past year do not need to retake the test. The laboratory instructor will verify your completion of the safety test via online records, immediately before first lab session. Check the Announcements page in Canvas for further instructions on how to access and complete the training.

Graduate Composition and Communication Requirement (GCCR) for graduation: BIO 350 fulfills the writing requirement of the GCCR for graduation. According to University rules, students must earn at least 70% on the GCCR writing assignments to graduate. Therefore, *the student must earn at least 140 out of 200 points on the GCCR assignments* in BIO 350 to earn this credit that is *required for graduation*. At the end of the semester, if a student has at least a D in the entire course (≥ 420 points, $\geq 60\%$), but s/he has earned less than 70% on his/her GCCR assignments, s/he will be given an **INCOMPLETE** for the BIO 350 course. In order to rectify the INCOMPLETE and be assigned a grade for BIO 350, s/he must fill out an Incomplete form with Dr. Danley AND do one of the following:

1) Complete WRD 204 with at least a 70% in the course by May 2020

OR

2) Complete a 14-page GCCR writing assignment within 30 days after the final BIO 350 grade is posted to Canvas AND earn at least 70% on that assignment (assignment will be administered and graded by Drs. Cooper and Danley). This 14-page assignment will not contribute to nor change the student's final grade in BIO350, it is only used to fulfill the GCCR requirement.

Note that if a student is failing BIO 350 (<368 points total), then s/he will not earn GCCR credit nor credit for BIO 350.

Questions About Grades

If you have a concern regarding your posted score for an assignment or exam, you have 1 week from the day the scores are posted (in Canvas) to contest that score. After one week the score remains as posted. It is your responsibility to check your scores in a timely manner and to follow-up immediately if you have a concern. Contact Dr. Cooper for any exam or Dr. Danley for laboratory related questions.

*****A Note Concerning Academic Offenses (READ THIS INFORMATION CAREFULLY)**

PLAGIARISM and CHEATING are serious academic offenses.

The following is an excerpt taken from the “*Students Rights and Responsibilities Handbook, University of Kentucky*” regarding cheating.

"Cheating is defined by its general usage. It includes, but is not limited to, the wrongful giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade."

The following is an excerpt taken from the “*Students Rights and Responsibilities Handbook, University of Kentucky*” regarding plagiarism.

"All academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression."

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

*Plagiarism includes reproducing someone else's work..... If the words of someone else are used, the student **MUST** put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic."*

All students will take an online (on Canvas) quiz about plagiarism. The student must repeat the quiz until s/he receives 100%. This quiz must be completed with 100% score before the first lab. The student will not be permitted to participate in the lab if the quiz is not completed, and the absence will count as an unexcused absence.

Charges of an academic offense will be made against any student that cheats or commits plagiarism. Penalties for such an offense will be assessed according to University Regulations regarding Academic Offenses. The most severe penalties include suspension or dismissal from the University. **We have a zero-tolerance policy regarding academic offenses.**

NOTE* In addition to the circumstances listed above, the following activities are considered evidence of cheating:

- 1) **Any talking** to another student during an examination.
- 2) **Looking** at another students work during an examination, or **allowing** another student to look at your work.
- 3) **Use of a cell phone or any electronic device during an examination** (this includes receiving calls). All cell phones and electronic devices **MUST** be turned off and put away during an examination period. They must not be turned back on again until after exiting the examination room.

BIO 350: Animal Physiology

See <http://web.as.uky.edu/Biology/faculty/cooper/Bio350-Spring2019/TEACHING350spring2019.htm>

BIO350: Lecture Schedule for Bio 350, Spring 2019 Sections 1-4

Lecture, Day, Topic Reading

1 1/10 How one learns. Homeostasis, Krogh principle Introduction to course and physiology. (Why comparative physiology-PDF) (ECHO360, [ms word file of looking up stuff](#))

Can't focus while studying.... turn off Facebook, texting and listen to [this](#) and read book.

Stress relaxation [here](#) and [here](#) .

2 1/15 Molecules, Energy and Biosynthesis [Movie](#) about COPD and O2 therapy ([checkout this blog](#)) and here is an Article ([PDF](#))

3 1/17 Membranes, Channels and Transport/ Physical basis of neuronal function (ECHO360)

4 1/22 Physical basis of neuronal function (ECHO360)

5 1/24 Physical basis of neuronal function (ECHO360)

6 1/29 Communication along and between neurons (ECHO360)
Chill out a bit with this [here](#)

7 1/31 Communication along and between neurons (ECHO360)

8 2/5 Communication along and between neurons (ECHO360) lecture quiz !!!!!!!!!!!!!!!!!!!!!.

9 2/7 Sensory Mechanisms. lecture quiz !!!!!!!!!!!!!!!!!!!!!. (ECHO360,)

LABS WILL MEET THIS WEEK FOR SECTIONS 1-4 EXAM review and lab activities

10 2/12 Sensory Mechanisms (ECHO360)

You can do it.... think of this mouse ([here](#))

11 2/14 EXAM DAY in Lecture

LABS WILL MEET THIS WEEK FOR SECTIONS 1-4 go over EXAMs and lab activities

12 2/19 Sensory Mechanisms/ Organization of Nervous System (ECHO360) (lecture assignment PDF, MS Word)

.....Muscle (Muscle man [Youtube Muscle man EMG music](#))

13 2/21 Muscle & Behavior (ECHO360,)

14 2/26 Muscle & Behavior (ECHO360)

15 2/28 Catch up lectures. (ECHO360)

In case you need to chillout and relax from stress [go here](#)

16 3/5 Behavior (ECHO360) Maybe in class quiz.

17 3/7 Endocrine ...Hypothalamus-Pituitary (ECHO360, PPT) (lecture assignment DUE-Midnight..... PDF, MS Word)

3/11-3/15 No class, Spring break

18 3/19 Thyroid, parathyroid, adrenal and pancreas (ECHO360)

19 3/21 Cont. Endocrine (ECHO360)

Links used : https://mymonthlycycles.com/menstrual_cycle.jsp

https://en.wikipedia.org/wiki/Development_of_the_reproductive_system

<https://courses.washington.edu/conj/bess/differentiation/differentiation.htm>

20 3/26 Cardiovascular (ECHO360,) QUIZ day

https://en.wikipedia.org/wiki/Einthoven%27s_triangle

<http://courses.kcumb.edu/physio/ecg%20primer/ecgaxis.htm>

21 3/28 Cardiovascular / Respiration (ECHO360)

To relax this weekend you need to hear this music maybe some more as well here

4/1 & 4/2 & 4/3 LABS WILL MEET THIS WEEK FOR SECTIONS 1-4 EXAMS given in each lab section

LONG EXAMS- 1 to 2 and ½ hours

22 4/2 Cardiovascular (ECHO360)

4/3 LABS WILL MEET THIS WEEK FOR SECTIONS 1-4 EXAMS given in each lab section

LONG EXAMS- 1 to 2 and ½ hours

23 4/4 Cardiovascular (ECHO360)

A very cool YouTube clip sent by your last year classmate: It is 4 minutes long and definitely a good watch.

<https://www.youtube.com/watch?v=YDspP4BhITw>

24 4/9 Respiration (ECHO360) Pre-recorded. **NO LECTURE IN CLASS THIS DAY**

25 4/11 Respiration/ Ionic and Osmotic Balance (ECHO360) - Go over exams in lecture

<https://abg.ninja/abg>

<http://www.rnceus.com/abgs/abgmethod.html>

Ion Normal blood concentration range (mmol.L⁻¹)

Sodium 135-145

Calcium 2.1-2.8

Potassium ~3.5-5.0

Chloride 95-105

pH 7.35-7.45

pCO₂ 35-45

HCO₃⁻ 22 to 26 mEq/liter (some other sources 21-28 mEq/L)

26 4/16 Ionic and Osmotic Balance (ECHO360) QUIZ DAY

11-Mar	No Lab	Spring Break	None
18-Mar	Lab 6	Student ECGs	GCCR 2 final submissions due
25-Mar	Lab 7	Student Water and Salt Balance	Lab 6 quiz due, Lab 6 worksheets due
1-Apr	COOPER's sections 1-4 Meet in lab	Exam 2 week- EXAMS given in lab LONG EXAMS- 1 to 2 and ½ hours	None
8-Apr	Lab 8	Student Lung Volumes and Dead Space	Lab 3 quiz due, Lab 3 worksheet due, GCCR 3 assigned
15-Apr	Open Lab	Last chance help with full reports	GCCR 3 final submissions due
22-Apr	No Lab	Dead week	None
29-Apr	No Lab	Finals week	None