

## **Biology 340 Animal Physiology Syllabus**

**Professor:** Dr. Jay Blundon

**Office:** Frazier Jelke 142W

**Phone:** X 3562

Welcome to Animal Physiology. Biology 340 is a one semester course that has the potential to cover many diverse topics that relate to animal physiology, both invertebrate and vertebrate. With all there is to study, we can attack this course with various strategies. Frequently the instructor will decide what is important for you to know, and then proceed with fast paced lectures which may be difficult to keep up with, not to mention understand. Studying for exams, perhaps multiple guess or true/false, can involve mass memorization. Retention of concepts months or even weeks after the course is over is often very low. I would like to make this course both informative and enjoyable, and I would also like to help you increase your ability to teach yourself. I prefer to emphasize major concepts in physiology and de-emphasize the memorization of numerous details and physiological terms.

My objectives for this course are to provide you with a variety of learning situations in order to a) give you a better understanding of and appreciation for animal physiology, and b) to further your experience in teaching yourself how to learn. You should also establish your own personal goals and objectives for this course and make a constant effort to meet these objectives.

I will try to make the course a more interesting learning experience by seeking more active student participation in many aspects of the course. During this semester, you will:

- 1) plan the course lecture schedule by suggesting topics of interest,
- 2) give an oral presentation so that you may share your interest in a specific topic with others and increase your skills at effective communication,
- 3) participate in exam writing, and in the evaluation (i.e. grading) of peer exams, oral presentations, lab reports, and research posters, and
- 4) perform several laboratory experiments which will then be presented in brief abstract format or as publication quality manuscripts or posters.

### **Grading**

Exams 1 and 2	30%
Final exam	22%
Oral presentations	8%
Laboratory	34% (two reports and one poster count 8% each, 10% for Lab abstracts, 2% each)
Homework	6%

### **Explanation of tasks**

#### Exams

1) Objective: Taking a test provides a valuable opportunity to review material you have learned in class and to examine the depth with which you understand concepts. We will discuss in class the appropriate criteria of

exam questions that will enable you to critically analyze course material and give you the opportunity to demonstrate your comprehension.

2) Exams will incorporate the best and most appropriate questions submitted by students beforehand. You will submit exam questions according to criteria established in advance. These questions are to be written by you individually, but you are encouraged to share the questions with your peers in preparation for the exams. Student exam questions (but not answers) will also be placed on the Academic Volume as a study aid.

3) The Final Exam will also incorporate student questions. On the last day of class, students will bring exam questions to class and within small groups these questions will be reviewed and discussed. Then groups will exchange the best questions they have reviewed and answer each others questions. These questions and answers will then be presented to the class as a whole for discussion.

4) The two lecture exams and the final exam will be closed book "open door" exams. The exams will be placed in a folder outside my office door. When you are ready to take the test, come to Frazier Jelke with no materials other than pencils and a blue book. Come to my office and sign out your copy of the exam. You must take the exam somewhere on campus in a public place. You will be given a limited amount of time to complete the exams, and the use of any notes, books, aid from other students, etc. will not be permitted. After you are finished the exam, or the allotted time has expired, return the exam to my office.

5) Exams will be evaluated by you and your peers during the next class following a detailed discussion of the correct answers. The criteria upon which answers will be evaluated will be agreed upon beforehand by the class, and the credit received under these criteria will be explicitly indicated by the evaluator of each question. Each of your answers will be graded by a different individual. To maintain anonymity of both student and grader, students will not put their names on their assignments, only their social security number.

6) I will review the peer evaluations of all exams to ensure fairness and equity among all students.

7) No make-up examinations will be given. A missed exam equals a zero. If you are absent for a medical reason, notify me as soon as possible. You will be given an oral exam as substitution for the written exam.

#### Oral presentation

1) Objective: The purpose of inviting students to prepare and deliver oral presentations to the class stems from my feelings that you are capable of learning from each other. The oral presentations provide a formal opportunity for the students to research a subject of particular interest to them, which also fits into the general theme of what the class is discussing, and to organize that material into an informative and effective presentation before an interested audience. Besides, one learns most when one has to "teach" or explain to others.

2) The material presented by students will become part of the general body of knowledge for which you are responsible. You can get ideas for

presentations from the lecture schedule, your text or other physiology texts, journal and review articles, or even from internet searches.

3) Format: The presentation is to last 10 - 12 minutes in duration. I will indicate the approximate end of the allotted time. At that time, if you have not already finished you should summarize the highlights. Three additional minutes will be allotted for questions from the class. In order to attain your objectives in the allotted time it is imperative that you practice your presentation. Clearly state the question you plan to address in your presentation, and don't be too ambitious in what you can accomplish in 12 minutes.

4) Supplementary material: To enhance the effectiveness of your presentation you should prepare an outline to be given to the audience before your talk and overhead transparencies you wish to use to clarify points.

5) Evaluation: The degree to which you have succeeded in achieving the objectives of your presentation will be judged by your peers. After each presentation the class will complete a brief evaluation form and provide written comments for the presenter. These forms will be returned to the presenter at the next class. On the basis of these evaluations, the presenter will arrive at a fair numerical grade for their effort which is to be submitted to me with written justification, within a week.

#### Homework

At the end of each class, I will give you a question or questions to prepare for the next class meeting and to facilitate class discussion. To encourage you and to reward you for preparing answers to class questions ahead of time, I will frequently but randomly collect the homework questions. You need not have all correct answers to receive credit for the homework, but you must complete the assignment. Exams questions written by students will also receive homework credit.

#### **What do I expect of you?**

I hope that this class will be informative, memorable, and enjoyable. I do ask many things of you. Most important is your enthusiasm, curiosity, and interest. If you bring these attitudes to class, you can't help but learn. Some additional specifics to do well in this course:

1) Read assigned materials before class and to come to class prepared with more questions to clarify your knowledge of the material. Prepare answers to homework questions thoroughly.

2) Follow the criteria established by the class for creating and answering exam questions, lab reports, and presentations, as well as the criteria for evaluating these assignments.

3) Be a verbal participant during class or lab time. If there's a concept you don't understand, then you're probably not alone. If you've come up with new questions based on your reading, ask them.

4) Accomplishments of the above items demand regular class and lab attendance (on time!).

#### **On-going evaluation of the course**

We're in this together! It has been said that the acquisition of knowledge is a personal exploration and not a guided tour. I hope that, along with class lectures and discussions, the many different tasks you will be assigned this semester will help you in your exploration of physiology. Yet I have never considered learning to be a one way street. Through the help and feedback of students, I am constantly trying to improve my ability to teach. I encourage you to provide feedback to me so that we can all better accomplish our goals for this course. I will solicit feedback from you in two ways:

1) Daily class log: I will provide a notebook which will be circulated in class during each meeting. In this book please feel free to make any comments whatsoever (anonymous or not) about the course. Comments may relate to specific questions about material in lecture or text that you feel need additional clarification, or may be about tasks assigned during the semester and how they help or hinder your learning about physiology. I will try to answer questions about class material either in class or directly in the log next to the entry. If you have helpful criticisms/suggestions regarding my teaching of the course (lectures, exams, labs, homework assignments, etc.), I will respond to them in the class log or in class and perhaps try to incorporate changes into the class. Also, by circulating the log book among the students, perhaps you will get the indication that you're not the only one in class who doesn't understand a certain concept or idea, and that it's OK to ask for additional help, either during class or later one on one with me. During non-class hours, the log book will be kept in a folder outside my office door.

2) Questionnaires: I will give you a questionnaire at mid-semester and again at the end of semester which will ask for feedback on many specific aspects of the course, whether these aspects have helped or hindered your learning physiology, and how you might improve the course. Again I will earnestly try to be responsive to your feedback.

### **Office hours**

Although I do have a few specific hours a week I have designated as office hours, if I'm not lecturing or teaching a lab I am usually in my office. If you have questions about material pertaining to the course or lab or about biology in general, comments or feedback about the way the semester is proceeding, please don't hesitate to stop by at any time. I feel one of the satisfactions that comes with teaching at a small institution such as Rhodes is the opportunities that both students and faculty have to get to know each other and learn from each other.

### **Academic dishonesty policy**

The outstanding Honor Code that Rhodes demands of all its students is highly commendable, and I have utmost trust that you will abide by the code. Here are some specific requirements I ask you to honor:

As stated above, preparation for homework questions may be done individually or in study groups. Exam questions written by you are to be done individually with no help from others. There will of course be no cheating on exams, either giving aid to another or receiving aid from a

student or other source. I also ask that you not use previous exams as a study guide, and lab reports written in previous semesters may not be used to help you.

## **Biology 340    Animal Physiology**

<i>date</i>	<i>lecture</i>	<i>additional student topics</i>
Sep.	2 Course introduction	
Sep.	4 Homeostasis and regulation - Intro to the Nervous System	
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Sep.	9 Electrical potentials in excitable neurons	
Sep.	11 Action potentials	
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Sep.	16 Intracellular communication - Neurotransmitters / second messengers	
Sep.	18 Sensory systems	<i>pain perception</i>
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Sep.	23 Structure and function of the Central / Peripheral Nervous Systems	<i>multiple sclerosis</i>
Sep.	25 Muscle structure, function, and energetics	<i>muscle fatigue</i>
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Sep.	30 Muscle excitation and mechanics	
Oct.	2 Muscle fiber types / Invertebrate muscle diversity	<i>Effects anabolic steroids</i>
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Oct.	2 Fall Recess	
Oct.	9 Guest speaker	
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Oct.	14 Evaluate Exam 1	
Oct.	16 Smooth muscles	
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Oct.	21 Mammalian circulatory system (incl. lymph system); Cardiac muscle	
Oct.	23 Cardiac signalling and EKG's	
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Oct.	28 JAB at Society for Neuroscience Convention	
Oct.	30 <i>Regulation of blood pressure</i>	<i>atherosclerosis</i>
Nov.	4 Gas transport; Mammalian lungs	
Nov.	6 Regulation of respiration	<i>High altitude adaptations</i>
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Nov.	11 Animal respiratory adaptations	<i>Avian lungs</i> <i>Aquatic gills</i> <i>Diving mammals</i>
Nov.	13 Water and ion balance - mammalian kidney function	
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Nov.	18 Evaluate Exam 2	
Nov.	20 Water and ion balance in marine, freshwater, and desert environments	
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Nov.	25 Introduction to digestion - secretions/anatomy	<i>Eating disorders/malnutrition</i>
Nov.	27 Thanksgiving Recess	
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Dec.	2 Regulation/coordination of gastrointestinal activity	<i>Ulcers /obesity gene</i>

Dec.	4	Functions of the liver and pancreas	<i>Diabetes</i>
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Dec.	9	Class discussion of student final exam questions	
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Dec.	17	Evaluate Final Exam 8:30 am - 11:00 am	

Dates for lecture schedule may vary slightly.

## ANIMAL PHYSIOLOGY SCHEDULE OF LABS

<i>date</i>	<i>lab</i>
Aug. 28	Lab intro; Physiological instrumentation and computer workstations
Sep. 8	Compound action potentials in frog sciatic nerve *
Sep. 15	Contractile properties of skeletal muscle
Sep. 22	Comparison of performance in two vertebrate skeletal muscles - Group Research Project I **
Sep. 29	Autonomic control of rat smooth muscle activity *
Oct. 6	Fall recess
Oct. 13	Intrinsic and extrinsic regulation of frog heart activity *
Oct. 20	Homeostatic regulation of blood pressure in the rat
Oct. 27	JAB at Society for Neuroscience, no lab
Nov. 3	Group Research Project II **
Nov. 10	Heart arrhythmias in the rat and antiarrhythmic drugs *
Nov. 17	Neural and humoral regulation of respiration *
Nov. 24	Renal function: Factors which influence urine production
Dec. 1	Group research project III ***
Dec. 8	Poster Presentations

\* Abstracts and/or answers to questions for these labs will be due 1 week after the lab is scheduled

\*\* Formal individual laboratory reports for these 2 labs will be due 1 week after the experiment is

concluded

\*\*\* One poster presentation will be submitted by each lab group on Dec. 8