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BIOL 425.01: Comparative Animal Physiology

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BIOL 435 (CRN 34188), Comparative Animal Physiology

Tuesday & Thursday 12:40 – 2 in Gallagher Business Building 108

Instructor: Dr. Art Woods
[BioResearch Building \(BRB\) 005](#)
406-243-5234
art.woods@mso.umt.edu
<http://woods-lab.dbs.umt.edu/cms/>

TA: Jema Rushe
[BioResearch Building \(BRB\) 108](#)
jema.rushe@umontana.edu

Office Hours. To be determined in class. Feel free to contact me and set up an appointment for an alternative time; email is best.

Textbook. *Animal Physiology*, 3rd Ed, by Hill, Wyse and Anderson, published by Sinauer Press (ISBN: 978-0878935598). Available in the UM bookstore and [online](#). I will also put a copy on 4-hour reserve at the Mansfield library.

Course Objectives. Traditional courses in animal physiology take systems- or organs-based approaches. This course will focus instead on identifying core principles, defining interesting problems, and examining the diversity of animal solutions to those problems. The course will also use primary papers and data, which give more realistic views of science-as-a-process than do textbooks or summary articles. By the end of the semester you will have developed an appreciation for the core principles in comparative animal physiology, major physiological problems faced by animals in their environments, predominant solutions to those problems, and the ecological and evolutionary contexts for those solutions.

Course Structure & Style. In recent years, I have been trying to lecture less and do more in-class discussions, activities, and demonstrations. I'm going to push this even further this year. Each week will be devoted to a particular topic, and I'll generally lecture only on part of one of the two days. In the rest of the time, we'll be reading and discussing papers, calculating answer to quantitative problems, and doing simple demonstrations and experiments in class. This style will have the consequence of putting the responsibility more squarely on your shoulders to keep up with the reading in the textbook. There simply won't be time for me to lecture on everything in all the chapters we cover.

Evaluation. TOTAL POINTS available: 700 (=100%). Points will be based on your performance on:

Midterms. Three midterms will be given during the semester (Feb 19, March 19, and April 21), each worth 100 points. 300 points total. Exams will contain both multiple-choice and short-answer formats. They will emphasize course content, concepts and intellectual synthesis.

Final exam. Final Exam from 1:10 – 3:10 on Monday, May 11th. 150 points. Cumulative; will include information from student powerpoint presentations (see below).

Paper summaries. Three 2-page summaries of scientific papers will be assigned (each worth 30 points). 60 points total. These will be assigned at roughly equal intervals throughout the semester. You will receive extensive feedback on first drafts and then will have the opportunity to turn in a second draft that will be graded.

In-class quizzes. At the beginning of eight of the Discussion periods, I will give short 10-minute quizzes, each worth 10 points. I will drop your three lowest scores, leaving 5 quizzes (total of 50 points).

Participation in the Top Hat response system. During most class periods, I will ask questions using the Top Hat system (<https://tophat.com/>). The system keeps track of your responses and participation. You will be scored on participation only (not whether or not you answered correctly!). Total points available: 50. You will get full credit if you participate in 75% of the questions asked, and it will scale down to zero points for 0% participation.

How it works: I will invite you to Top Hat using your umontana email address. During class, you will answer questions using your computer, tablet, or phone. I will then have access to those answers immediately onscreen. We'll ease into this at the beginning of the semester (I'm new to it too!).

Term presentation. The final 3 class periods will be devoted to short presentations on primary papers. You will work in groups of 2 or 3 to pose a physiological problem and then to discuss a paper containing data relevant to the problem. I expect all students to be at all presentations (required!). 90 points.

Term presentations will be 15 minutes long and followed by a 5-minute question and answer period. The order of presentations will be made based on a drawing to be held in the near future. Topics for presentations are open to anything in the field of comparative physiology, BUT they must present novel information to the class (no repetition of material that I will cover). Hence you'll be required to consult with me in ensure that your topic is appropriate. I will provide more instruction on this as the date approaches.

Term presentations will be given using Powerpoint. The goals are to identify a question or subject in comparative physiology, discuss the historical record of

research related to the area/question, discuss results of the latest research related to the area/question, and propose future experiments/research related to the area/question. The classroom is equipped with a PC computer and a digital projector. Macintosh users will have to make sure that their presentation can be displayed on a PC before the presentation.

Grading. Course grades will be determined using the following scale (+ & - will be used):

A: 90 – 100% B: 80 - 90% C: 70 - 80% D: 60 - 70% F < 60%

Communication. UM requires that all email communication between faculty and students use umontana or mso aliases. So I will only email you at your umontana address, and I would appreciate if you would email me only *from* your umontana address. Same for communication with the TA.

Attendance. You are required to attend all class meetings.

Credit/No Credit. Students interested in this option should see UM's Academic Policies at <http://www.umt.edu/catalog/academics/academic-policy-procedure.php>.

Audit. According to University policy, changing your grading option to audit is not allowed after the 15th day of instruction. See <http://www.umt.edu/catalog/academics/academic-policy-procedure.php>.

Incompletes. I will follow university policy on assigning incompletes: <http://www.umt.edu/catalog/academics/academic-policy-procedure.php>.

Student Conduct. All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Don't do it! The penalties can be severe.

Students must be familiar with the Student Conduct Code, which is available at http://www.umt.edu/vpsa/policies/student_conduct.php.

Harassment. Harassment of any kind (sexual, racial, religious, disability-based, etc.) will not be tolerated in this class. If you feel that you are being harassed, please see me. In addition, there are many resources available on campus, which you can find here: <http://www.umt.edu/eo/equalop/harassment.php>

Make-up Exams. Make-up exams are not considered a right, but are reserved for students who are prevented from taking an examination on the originally scheduled date due to:

1. a documented illness,

2. or documentation of participation in a University-sanctioned activity

A. Documentation of participation in a University-sanctioned activity requires written communication from the University of Montana Office of Academic Advising.

B. Student athletes must provide this documentation to Dr. Woods in the first week of classes.

You must call me at 406-243-5234 before the scheduled time of the exam in order to communicate the nature of the problem you feel precludes you from taking it. Absolutely no make-up examinations will be scheduled if you have not communicated with me before the scheduled exam. Also, note that simply informing me that you will be absent does not constitute an excused absence.

Extra Credit. Not provided; please don't ask.

Disabilities. I am committed to creating an environment of equal access for students with and without disabilities. To be fair to all students, I will adhere to the Americans with Disabilities Act and Section 504 of the Rehabilitation Act by only making accommodations based upon guidance received from the University of Montana Disability Services for Students (DSS) (<http://www.umt.edu/dss>). Before these accommodations can be suggested and granted, "DSS requires comprehensive documentation of a disability and its impact on learning."

Information required for verifying disabilities may be found at <http://life.umt.edu/dss/>.

In addition, I have been working to make my documents (Word, PPT) more accessible, and I will continue to be updating them during the semester.

Religious holidays: Absence due to religious holiday will be excused, with appropriate policies applied. Please notify me about this by February 15.

Official extracurricular activity: Absence due to official extracurricular activity will be excused, with appropriate policies applied. Please notify me about this no less than one week prior to missed class(es).

Lecture Schedule

DATE	TOPIC	TEXT
1/27	Course Intro	Ch 1
1/29	Core principles of Comparative Animal Phys.	
2/3	Nutrition, feeding, and digestion	Ch 6
2/5	Discussion of nutrition, feeding, digestion	
2/10	Good writing, and becoming a better writer	

2/12	Energy metabolism	Ch 7
2/17	Discussion of energy metabolism	
2/19	MIDTERM EXAM 1	
2/24	Aerobic vs anaerobic metabolism	Ch 8
2/26	Discussion	
3/3	Thermal relations and thermoregulation	Ch 10
3/5	Discussion	
3/10	How muscles work	Ch 20
3/12	Discussion	
3/17	Muscle use and disuse + discussion	Ch 21
3/19	MIDTERM EXAM 2	
3/24	Exchanging gases: O ₂ and CO ₂	Ch 22, 23
3/26	Discussion	
3/31 & 4/2	Spring Break , no classes	
4/7	Circulatory gas transport & diving mammals	Ch 24
4/9	Discussion	
4/14	Circulation	Ch 25
4/16	Discussion	
4/21	MIDTERM EXAM 3	
4/23	Water and solute homeostasis	Ch 27, 28 (Ch 4 for background if needed)
4/28	Discussion	
4/30	Student term presentations	
5/5	Student term presentations	
5/7	Student term presentations	
5/11	Final Exam Monday, 1:10 – 3:10 in normal classroom	