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BIOB 435.01: Comparative Animal Physiology

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BIOB 435, Comparative Animal Physiology

Tuesday & Thursday 12:30 – 1:50 in LA 234

Instructor: Dr. Zachary Cheviron
Interdisciplinary Science Building 317
406-243-4496
zac.cheviron@mso.umt.edu

TA: Jessica Bailey (jessica1.bailey@umconnect.umt.edu)

Office Hours: 1:30-3:30 Tues. or by appointment.

Textbook. I do not require a textbook for this course. Instead, we will use papers from the primary literature as the text for this course. These readings will be posted weekly to the course moodle page (see below).

Learning Objectives. Traditional courses in animal physiology are often system- or organ-based surveys across major animal lineages. This course will cover these systems, but from a different perspective. We will focus instead on five primary environmental challenges that animals face in every habitat on the planet (temperature regulation, gas exchange, ion and water balance, nutrient acquisition, and sensing and responding to the environment). We will explore how evolution has produced solutions to these challenges, how these challenges may be exacerbated in our current era of rapid environmental challenge, and how the evolutionary history of these physiological systems may constrain or promote the ability of certain animal lineages to respond to these new challenges.

From this perspective, we will discuss a wide range of physiological systems. The course will also focus on primary literature and data therein, giving a more realistic view of science-as-a-process than textbooks or summary articles.

By the end of the semester you will understand:

- 1.) the core principles in comparative animal physiology,
- 2.) the major physiological problems faced by animals in their environments,
- 3.) common evolutionary solutions to those problems,
- 4.) how an understanding of animal physiology can be used to better predict which animal groups might be most sensitive to rapid environmental change.

Course Structure & Style. This is an upper-division course. As such, there will be less formal lecturing and more in-class discussions than you may have had in your previous courses. Some periods, I'll lecture for a good portion of the meeting. Other periods students will lead lectures. When we're not lecturing, we'll read and discuss papers, calculate answers to quantitative problems, and potentially do simple demonstrations in class. This style will have the consequence of putting the responsibility more on you to keep up with the readings we assign, and to be an active participant in the classroom.

Course moodle page. There is one, and we will post all electronic media from the course to it. We will also keep the course gradebook on moodle so that you'll always have access to up to date information on how you're doing in the class.

Evaluation. Your grade will be determined by your combined performance on:

1.) Paper Presentations (50 points 10% of your total grade) One of our primary learning objectives for this course is to equip you with the skills to systematically read, interpret, and critique papers in the primary literature. As a result, 2/3 of our meeting periods will be devoted to discussing scientific articles on specific topics in comparative physiology, and you, the students, will lead these discussions.

Each student will present one paper. Students will sign up to review a topic and to present a scientific paper from the primary literature to the class. Each *presentation* will be approximately 20 minutes long, and the presenter will then use the remainder of the period to lead discussion on the focal paper. Speakers will also prepare a *one-page handout* for the class to use during the discussion portion of the presentation. These must be uploaded to the daily Moodle section 24 hours prior to the start of class.

During the first few class periods, students will have the opportunity to choose a paper from a list that I provide. Don't worry if the topics seem complex—a key goal of this class is to learn how to distill such complexity into something useful. I will start us off by giving the first paper presentation myself. This will enable students to see what is expected, and we will go over the rubrics for grade evaluation in class prior to the first student presentation.

2.) Class participation (50 pts. 10% of your total grade). Students will be graded on daily participation. For class periods with a student presenter, non-presenting students must submit a completed discussion worksheet via Moodle, prior to the start of class. Students are expected to ask questions and/or contribute their perspectives during each discussion period. PLEASE REMEMBER that we are all here to learn together, and the more you participate, the more we can all learn, including me.

Paper discussions will often involve working in small groups on a series of discussion questions that the student leader will provide during the class period. Small groups will report their answers to the larger class and you will be graded on your participation in these group discussions. I will provide information on expectations for these activities prior to first paper discussion.

3.) Exams (300 pts. 60% of your total grade). There will be three exams over the course of the semester (See course schedule), each worth is 100 points (300 points total). Exams will contain both multiple-choice and short-answer questions. They will emphasize course content, information from the assigned papers, concepts we covered in our discussions, and intellectual synthesis.

4.) Term presentation (100 pts. 20% of your total grade). The final 4 class periods will be devoted to short presentations on controversial topics in comparative physiology. 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. We will provide example topics that you are free to choose if you would like, however, the more intellectually curious among you, may also present on topic of their own choosing (after clearing them with Dr. Cheviron). I expect all students to be at all presentations, and material presented in these presentations will be included in the final exam.

I will provide a detailed rubric and advice on structuring these presentations as the date draws nearer. 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 toward the middle of the semester. These presentations will be worth 100 points.

Grading Scale. Grades will be assigned in the +/- system, according to the following scheme:

Component	Points	Weighting
Exam 1	100	20%
Exam 2	100	20%

Grade	Percent of Total Points
A	93-100%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99%
D+	67-69.99%
D	63-66.99%
D-	60-62.99%
F	Below 60%

Exam 3	100	20%
Participation	50	10%
Paper Presentation	50	10%
Term presentation	100	20%
Total	500	100%

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. Attendance is expected at all class meetings, with the exception of illness and official excused absences.

Credit/No Credit. Students interested in this option should see [UM's Academic Policies](#).

Audit. [According to University policy](#), changing your grading option to audit is not allowed after the 15th day of instruction.

Incompletes. We will follow [university policy on assigning incompletes](#).

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. The rules are laid out in UM's [Student Conduct Code](#).

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.

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. Cheviron in the first week of classes.

You must contact me 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.

Accessibility, disabilities, and special accommodations:

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, ode@umontana.edu, or visit www.umt.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish. Any questions please contact me.

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).