

# P416 – COMPARATIVE ANIMAL PHYSIOLOGY

## Fall Semester, 2005

**Instructor:** Dr. Michael S. Finkler

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**Web Pages:** <http://oncourse.iu.edu>

<http://www.indiana.edu/~nimsmsf/P416/P416.htm>

**Textbook:** Animal Physiology by Hill, Wyse, and Anderson

Other readings will be posted online.

**Description:** P416 provides an overview of basic physiological concepts and the various approaches different organisms have adapted to meet their physiological needs. The course focuses on the relationship between the organism and its environment, and how the organism maintains the consistency of conditions within its body (which is necessary for life to continue) in the face of variable environmental conditions.

**Objectives:** The course will provide the student with an understanding of fundamental physiological concepts which can be applied to understanding physiological functions in a wide array of different organisms, and an appreciation for the diversity with which different organisms approach physiological problems. Moreover, the course will help the student to develop critical thinking skills, writing skills, and the ability to synthesize information through review of the literature and the writing of essay exams and research papers.

**Prerequisites:** P416 is an upper-level course for students majoring in biology and related life science programs. Prerequisites include two college-level biology courses, one college level mathematics course (M117 or higher) and general chemistry through C106. *Students should not enroll in this course without having completed these prerequisites.* In addition, completion of organic chemistry and introductory physics is recommended.

**Grades:** Course grades will be evaluated on a standard +/- scale (93+% = A, 90-93% = A-, etc.), and will be based on the following items, with 600 points possible in the course.

Four exams (100 points each)	400 points
Research Project	
First submission of research paper	70 points
Oral presentation of the research paper	40 points
Review of a colleagues' research paper	20 points
Final submission of research paper	70 points

**Exams:** Exams will cover both lecture and readings, and will consist primarily of short answer and essay questions. These essay questions will ask the student 1) to overview physiological concepts and the means by which different animals address their physiological requirements, and 2) to apply basic physiological concepts learned in lecture to solving a specific physiological problem not previously discussed in lecture or covered in assigned readings.

**Research Project:** Each student will conduct independent literature research on a topic in comparative physiology of the student's interest (e.g. cardiac shunting in reptiles, renal function in insects, etc.). They will write a paper on the subject, provide an oral presentation of the paper to the class, and conducting a peer-review of a fellow student's paper. **All parts of the research project must be completed in order to receive a grade for the project. Late project assignments will NOT be accepted.**

Papers:

Each student will write a research paper reviewing the literature on their topic of interest. The specific topic should be discussed with the instructor prior to commencing the research. The paper will be a formal scientific paper with appropriate citations and references and the body of the paper (not including title page and literature cited section) must be a *minimum* of seven (7) double-spaced pages in length with standard font sizes and margins. Each paper must cover a minimum of five (5) primary research papers from at least three different journals, although review papers and chapters from books may be used to supplement this material. See the P416 website for additional information regarding this assignment, such as citation format, etc.

Each paper will be submitted twice. The first submission of the paper will be worth 70 points. The instructor and a peer (see below) will make appropriate comments on the paper, and return it to the student. The student will then revise the paper accordingly, and resubmit the paper, along with an outline of changes made or rationale for not making changes suggested by the reviewer(s), for the remaining 70 points of the grade.

Peer Review:

The research paper will also be reviewed by another student in the class. The peer reviewer will submit a 1-2 page review of their colleague's paper including comments and suggestions for its improvement. The name of the reviewer will not be revealed to the author unless the reviewer desires so. The review is worth 20 points

Oral Presentation:

Each student will make a brief presentation ( $\leq 8$  min + 2 min for questions) based on their research paper during the last class period of the course. The presenter should provide visuals to help illustrate the topic (e.g., PowerPoint). Students are encouraged to contact the instructor for assistance. The presentation is worth 40 points

**Attendance and Decorum:** Punctual attendance at all class sessions is expected, and will be recorded regularly. Moreover, students are to be respectful of the learning environment. The instructor reserves the right to lower a student's course grade in light of poor attendance or repeated disruptive behaviors such as chronic tardiness, sleeping in class, loud talking during lecture, reading materials unrelated to the class (e.g., novels, newspapers) or failure to turn off cellular phones during class.

**Web Resources:** Oncourse will be used to post student grades and course announcements, and also provides a means for students to discuss topics with one another. I will post handout versions of PowerPoint presentations, supplemental readings, research tools, and other items on the P416 web site.

**Academic Honesty:** It is expected that all assignments conducted during this course are the sole efforts of the individual students. The instructors will not tolerate ANY breaches of academic honesty (e.g., cheating on exams, plagiarism on research papers, etc.), and will investigate indications of such. If concrete evidence of academic dishonesty is found, the instructor will file a report on the academic misconduct incident to the Dean of Students. Depending on the severity of the incident, academic misconduct could lead to failure of the course (with an academic dishonesty notation made on the student's transcript and no chance to "FX" the grade) or even dismissal from Indiana University. Policies on student rights, responsibilities, and conduct can be found at the following web page: <http://dsa.indiana.edu/Code/index.html>

P416 – COURSE TOPIC OUTLINE (subject to change)

<b>Date</b>	<b>Lecture Topics</b>	<b>Textbook Readings*</b>
Aug 22	Introduction to Comparative Physiology	Chapter 1
Aug 24	Body Size and Scaling	PDF file posted on Oncourse
Aug 29	Enzyme function and cell signaling	Chapter 2
Aug 31	Water and Solute Transport	Chapter 3
<b>Sept 5</b>	<b>Labor Day -- No Class</b>	
Sept 7	Water and Solute Transport (Continued)	Chapter 3
Sept 12	External gas exchange	Chapters 20-21
Sept 14	External gas exchange (continued)	Chapters 20-21
<b>Sept 19</b>	<b>EXAM #1: Through "External Gas Exchange"</b>	
Sept 21	Internal gas transport	Chapter 22
Sept 26	Circulation	Chapters 23-24
Sept 28	Circulation	Chapters 23-24
Oct 3	Food and Digestion	Chapter 4
<b>Oct 5</b>	<b>Guest speaker--Dr. Paul Sotherland, Kalamazoo College</b>	
Oct 10	Food and Digestion	Chapter 4
Oct 12	Energy Metabolism	Chapters 5-7
<b>Oct 17</b>	Energy Metabolism	Chapters 5-7
<b>Oct 19</b>	<b>EXAM #2: Through "Energy Metabolism"</b>	
Oct 24	Temperature	Chapter 8
Oct 26	Temperature	Chapter 8
Oct 31	Water and Osmotic Regulation	Chapters 25-26
Nov 2	Water and Osmotic Regulation	Chapters 25-26
Nov 7	Excretion	Chapter 27-28
<b>Nov 9</b>	<b>EXAM #3: Through "Excretion"</b>	
Nov 14	Neurophysiology	Chapters 10-12
Nov 16	Neurophysiology	Chapters 10-12
Nov 21	Hormones <b>First Submission of Research Papers</b>	Chapter 14
<b>Nov 23</b>	<b>Thanksgiving Holiday--No Class</b>	
Nov 28	Senses <b>Peer Reviews Due</b>	Chapter 13
Nov 30	Movement and Muscle	Chapters 17-19
Dec 5	Movement and Muscle	Chapters 17-19
<b>Dec 7</b>	<b>Paper Presentations / Revised Papers Due</b>	
<b>Dec 12</b>	<b>FINAL EXAM</b>	

\* Additional readings for each topic will be posted as PDF files on the P416 web site

**The last day to drop the Course is Monday, November 28 (the Monday after Thanksgiving).**