2015

414-01 Adaptive Animal Physiology

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BIOL414: Adaptive Animal Physiology  
Spring 2015

PROFESSOR: Dr. Lisa Close-Jacob  
Albers 212  
(513) 745-3848  
closejcb@xavier.edu

CLASS MEETING TIME: MW 5:00-6:15 pm  
Albers 107

OFFICE HOURS: Monday 1:30-2:30 pm  
Wednesday 2:00-3:00 pm  
Thursday 2:00-3:00 pm  
Other times by appt or just drop by

COURSE COMMUNICATIONS: We will be using Canvas for communication and posting of information. You should check your email regularly for information about the class.


PREREQUISITES: The prerequisite for this course is a passing grade in Human Physiology (BIOL410). We will be drawing upon much of the information presented in Human Physiology as we examine the ways in which physiology is adapted to a challenging body structure or difficult environment.

COURSE GOALS: The overall goals of this course are to increase your knowledge of physiological processes, to think scientifically, and to improve your ability to communicate scientifically.

COURSE DESCRIPTION & OBJECTIVES: How do diving mammals survive under the enormous pressures of mile-deep water? What sets our biological clocks? What drives the stress response in animals? The objective of this course is to examine how physiological processes are used to enable animals to carry out specific behaviors or live in specialized environments. We will use our knowledge of physiology to explore these topics and gain an understanding of physiological processes in different animals.

COURSE PHILOSOPHY: As you are advanced students, my philosophy for this course is to have interesting discussions on a wide variety of topics that will allow you to draw on information you have learned in other courses. While some of the material will of necessity be lecture-based, I much prefer talking with you, rather than at you, in the classroom. So our work will be geared along those lines. As much as possible, I would like the class to develop along lines that you help to define.

EARNING POINTS: You will have the following opportunities to earn points for the course:

CLASS PARTICIPATION: I see this class as being partly me presenting information to you (particularly background physiology if we didn’t cover it in Human Physiology), but with this small class size, we can work on things a little differently. It will be important for you to be able to participate in the process by coming to class prepared for the day’s work, as well as being willing to contribute when we tackle some collective learning work. For these reasons, I will be considering class participation as a component of your grade. It will be worth 5% of your grade for the class.

TESTS: Tests will contain multiple choice, matching, and short-answer questions. There will be three tests for the term plus your final exam. The tests will cover material presented since the previous test. Please keep in mind that the study of physiology continually builds upon itself, so in essence, the material is cumulative. Therefore it is in your own best interests to master each topic in order to give the best answers to questions on later tests. These exams will be worth 55% of your grade.
ANIMAL STUDY PROJECT: Each of you will find a topic to research independently. As part of this study, you will be doing research, making a zoo/aquarium visit to observe the animal(s), writing a paper, and presenting a lecture on your topic to the class. See the Animal Study Project handout for more details. I will be giving you periodic deadlines for progress reports over the course of the semester. This project will be worth 30% of your grade.

FINAL EXAM: The final exam will consist of questions based upon the material presented since the third test as well as information from the Animal Study project (including both paper and presentations). These questions will be drawn from the basic physiology as well as the adaptations of the animal studied. The final will be worth 10% of your grade.

COURSE ADMINISTRATION: Some administrative information you need to know-

COURSE POLICY ON ACADEMIC HONESTY:

My expectation: I expect you to have the highest personal integrity.

The University’s expectation: from the Xavier University Online Catalog:

‘The pursuit of truth demands high standards of personal honesty. Academic and professional life requires a trust based upon integrity of the written and spoken word. Accordingly, violations of certain standards of ethical behavior will not be tolerated at Xavier University. These include theft, cheating, plagiarism, and unauthorized assistance in assignments and tests…(and) the falsification of results and material submitted in reports.”

“All work submitted for academic evaluation must be the student’s own. Certainly, the activities of other scholars will influence all students. However, the direct and unattributed use of another’s efforts is prohibited, as is the use of any work untruthfully submitted as one's own.

“Penalties for violations of this policy may include one or more of the following: a zero for that assignment or test, a final grade of F in the course, and expulsion from the University. The dean of the college in which the student is enrolled is to be informed in writing of all such incidents….”

MAKE-UP POLICY: Anticipated exam dates are listed on the attached schedule. Students are expected to take the exams at the scheduled times; exceptions will be made only with advance arrangements and only with good cause.

GRADING: The scale below reflects the points you must earn to reach a particular level of achievement:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100%</td>
</tr>
<tr>
<td>A-</td>
<td>90-92%</td>
</tr>
<tr>
<td>B+</td>
<td>87-89%</td>
</tr>
<tr>
<td>B</td>
<td>83-86%</td>
</tr>
<tr>
<td>B-</td>
<td>80-82%</td>
</tr>
<tr>
<td>C+</td>
<td>77-79%</td>
</tr>
<tr>
<td>C</td>
<td>73-76%</td>
</tr>
<tr>
<td>C-</td>
<td>70-72%</td>
</tr>
<tr>
<td>D+</td>
<td>66-69%</td>
</tr>
<tr>
<td>D</td>
<td>60-65%</td>
</tr>
<tr>
<td>F</td>
<td>less than 60%</td>
</tr>
</tbody>
</table>

READING AND TEST SCHEDULE: The following is a tentative list of topics and test times that may change at the discretion of the professor or the suggestion of students.

Topics:

<table>
<thead>
<tr>
<th>Reading (3rd ed.)</th>
<th>Suggested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Systems: Potential Topics on Nervous System and Endocrine Activity</td>
<td></td>
</tr>
<tr>
<td>Synaptic plasticity</td>
<td>350-357</td>
</tr>
<tr>
<td>Biological clocks</td>
<td>410-417</td>
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<tr>
<td>Pain signaling and suppression: natural opioids</td>
<td>Handout</td>
</tr>
<tr>
<td>Stress responses</td>
<td>432-436</td>
</tr>
<tr>
<td>Vision</td>
<td>381-395</td>
</tr>
</tbody>
</table>
Integrative Topic: Diving Mammals
- Background Physiology: Regulation of Internal Environment-Respiration
  ➢ External Respiration 569-615
  ➢ Transport of Gases 617-645
  ➢ Diving Physiology 679-696

Integrative Topic: Desert Environments
- Background Physiology: Regulation of Internal Environment-The Kidney and Extracellular Fluid Composition
  ➢ Kidney function 753-785
  ➢ Water and salt balance 699-714
  ➢ Desert Environments 785-800

Integrative Topic: Animal Navigation and Migration 485-498

Tentative Test Schedule:
  ➢ Test 1: week of 2/9/15
  ➢ Test 2: week of 3/9/15
  ➢ Test 3: week of 4/6/15
  ➢ Final Exam: Monday, May 4, 2015, 5:00-6:50 pm, Albers 107

Animal Study Expert Lecture Series Schedule:

Animal Study Expert Lectures will begin on Monday, April 13, with two lectures per class period. I will be asking you to come up with a topic by January 28, 2015 as I will need to request tickets for the zoo/aquarium for you. First come-first served on presentation topics and dates; topics are subject to my approval.

Education Students: This class meets NSTA Standards 1b, 1d, 3a, and 3b for Teaching Science.