BIOLOGY 310 – Principles of Physiology – Fall 2008

SYLLABUS

Instructor: **Dr. Ian van Tets**
Office: EBL,124. Office Hours: Tues. & Thurs. between 10:00 and 12:00 or by appointment.
Phone: 786-4705. E-mail: afivt@uaa.alaska.edu Web page: http://hosting.uaa.alaska.edu/afivt/
Text: *Principles of Animal Physiology, 2nd edition* by Moyes & Schulte 2007
Lectures: Tuesday & Thursday 8.30 to 9.45 am in RH 117

LECTURE SCHEDULE

Day	Date	Lecture Topic	Text chapter	Friday Lab. topic
Tues	Aug 26	1 – Chemistry of Life	2	
Thurs	Aug 28	2 – Chemistry of Life	2	No lab
Tues	Sept 2	**NO LECTURE - LABOR DAY**		
Thurs	Sept 4	3 – Cell metabolism & Physiology	2	No lab
Tues	Sept 9	4 – Cell metabolism & Physiology	2	
Thurs	Sept 11	5 – Cell metabolism & Physiology	2/3	PX: Cell tpt
Tues	Sept 16	6 – Hormones & cell signaling	3	
Thurs	Sept 18	7 – Hormones & cell signaling	3	No lab
Tues	**Sept 23**	**SECTION TEST 1**	**Lectures 1-7**	
Thurs	Sept 25	8 – Hormones & cell signaling (reproduction)	3, 14	PX: hormones
Tues	Sept 30	9 – Neuron structure & Function	4	
Thurs	Oct 2	10 – Neuron structure & Function	4	No lab
Tues	Oct 7	11 – Neuron structure & Function	4	
Thurs	Oct 9	12 – Functional organization of nervous systems	7	PX,LM: nerves
Tues	Oct 14	13 – Cellular Movement & Muscles	5	
Thurs	Oct 16	14 – Cellular Movement & Muscles	5	PX,LM: muscle
Tues	**Oct 21**	**SECTION TEST 2**	**Lectures 8-14**	
Thurs	Oct 23	15 – Circulatory systems (the mammalian heart)	8	PX,LM: circ & resp
Tues	Oct 28	16 – Respiratory systems	9	
Thurs	Oct 30	17 - Respiratory systems	9	PX,LM: circ & resp
Tues	Nov 4	18 - Respiratory systems	9	
Thurs	Nov 6	19 – Ion & water balance	10	PX/LM: kidney
Tues	Nov 11	20 – Ion & water balance	10	
Thurs	Nov 13	21 – Digestion	11	PX: digestion
Tues	Nov 18	22 - Digestion	11	
Thurs	Nov 20	**SECTION TEST 3**	**Lectures 15-22**	LM: thermal
Tues	**Nov 25**	23 - Thermal Physiology	13	
Thurs	Nov 27	THANKSGIVING		No lab
Tues	Dec 2	24 – Thermal Physiology	13	
Thurs	Dec 4	REVISION	Lectures 1-24	No lab
Thurs	Dec 11	**CUMULATIVE FINAL EXAM: 7 – 9.45 am**	**Lectures 1-24**	

PX = simulation exercise from PhysioEx 8.0, LM = practical exercise from laboratory manual

LABORATORY SCHEDULE

Laboratory Instructor: **Kalb Stevenson, MS**
Phone: 786-1534. E-mail: ftkts2@uaf.edu
Lab. Manuals:
PhysioEx 8.0 (2008) by T. Stabler *et al*.
Laboratory Manual for Biology 310 – Principles of Physiology. (2008)
Laboratory sessions: Fridays in BMH 105: Morning (602): 8.30 – 11.15
Early afternoon (603): 11:45 – 2.30
Late afternoon (604): 3.00 – 5.45

Day	Date	Laboratory Topic	PhysioEx. exercise	Lab. Manual exercise
Fri	Aug 29	**No lab**		
Fri	Sept 5	**No lab**		
Fri	Sept 12	Cell metabolism & Physiology: **Cell transport**	1	none
Fri	Sept 19	**No lab.**		
Fri	Sept 26	Hormones & cell signaling: **Endocrine system physiology**	4	none
Fri	Oct 3	**No lab.**		
Fri	Oct 10	Neuron structure & Function: **Nerve Impulses & How does the skin feel**	3	1
Fr	Oct 17	Cellular Movement & Muscles: **Skeletal muscle phys. & Electromyography**	2	2
Fri	Oct 24	Circulation & Respiration: **Cardiovascular dynamics & physiology, Heart, Lung & Fitness**	5, 6	3
Fri	Oct 31	Circulation & Respiration: **Resp. System Mechanics, Acid Base balance, Heart, Lung & Fitness**	7,10	3 continued
Fri	Nov 7	Ion & water balance: **Renal system physiology & urinalysis**	9	4
Fri	Nov 14	Digestion: **Chem. & Phys. Processes of digestion**	8	
Fri	Nov 21	Thermal Physiology: **Thermoregulation**		5 - Thermoregulation
Fri	Nov 28	**NO LAB - THANKSGIVING**		
Fri	Dec 5	**No lab.**		

Unless instructed otherwise by the lab. instructor, Students will be expected to submit for assessment:

- For labs involving PhysioEx exercises:
  - The **relevant PhysioEx review sheet(s)** before leaving the laboratory class
- For labs involving Lab manual or other practical exercises
  - A **laboratory report** that conforms to the instructions issued with the exercise no later than the following laboratory class.

Course summary:

Principles of Physiology is a lecture and laboratory-based course intended to introduce students to the fundamental principles of physiology. The course covers these principles in a sequence that builds from cellular physiology through the physiology of specific systems to an example of integrated physiology: thermoregulation. The laboratory classes are intended to correspond with and to enrich the lecture material and will progress from simulation exercises to hands-on exercises as the semester progresses.

The course is intended to serve the needs of both classical biology majors with an interest in animal physiology and to also serve the needs of students who are intending to progress into medicine or related fields. The course content is tailored accordingly to prepare students for 400 and higher level animal physiology courses, while also covering the physiological material needed for the pre-medical MCAT exams.

The course draws heavily on vertebrate examples and, in particular, on mammalian and more especially human examples. The principles covered do, however, apply to all animals. Students with an interest in the physiology of other animal taxa (birds, fish, insects, marine invertebrates) are encouraged to discuss ways of exploring their interest further with the course instructor.

Note 1: For biology courses with a lecture and a laboratory component, **such as this course**, students may not carry forward an individual lecture or laboratory grade from a previous semester in which the course was taken.

Note 2: Every reasonable effort will be made to cover the course material as described in the schedule. However, professorial discretion and/or circumstances may lead to revision of the course content. Class attendance is expected, and students may be force-dropped for non-attendance, as stated in the UAA catalog.

Special Assistance:

Students with disabilities

If you experience a disability and would like information about support services, please contact Disability Support Services. Location: BEB 105 Telephone: 786-4530

Rural and Alaska native students

Students from rural or Alaska native backgrounds are encouraged to contact Native Student Services and to make use of the resources that are available to them there. The school of nursing's RRANN program employs anatomy and physiology tutors to assist rural and AK native students with Biology 111 & 112. These tutors are familiar with the material that will be covered in Biology 310 and are usually willing to help if they have time to do so.

The AHAINA office, located on the ground floor of Rasmussen Hall, also has resources available to assist students from international or under-represented minority backgrounds.

Students for whom English is a second language

If English is not your first language and you have difficulty writing essays in English under exam conditions, please come and see me (Dr. van Tets, course instructor) during my office hours at the earliest opportunity, so that we can discuss the most appropriate way of addressing this.

All students:

If you find yourself facing challenges that are likely to adversely affect your performance in this course, please come and see me (Dr. van Tets, course instructor) during my office hours at the earliest opportunity, so that we can discuss the most appropriate way of addressing this.

Course & Reference Materials

Lecture Notes

Lectures will be based on PowerPoint presentations. These presentations will be made available on the course blackboard site prior to each class. Students are encouraged to print these presentations and to bring the printouts with them to class to make their note-taking easier and more productive.

Textbook

The textbook for the course is the second edition of *Principles of Animal Physiology* by Moyes and Schulte (2007). Reading the relevant chapters prior to lectures and working through the review and synthesis questions at the end of each chapter will greatly enhance your ability to follow and critically respond to the lecture material. The questions in the section tests will be based on the material presented in lectures rather than the textbook. The tests will, however, be heavily weighted towards questions that assess your ability to clearly, correctly and concisely describe physiological concepts. The textbook should help you to do this.

Reserved Materials (Consortium Library)

A copy of the course textbook has been placed on reserve in the consortium library for in library use by students in this course. A number of other physiology texts have also been reserved for short term loans by Biology 310 students. These include: Human Physiology by Sherwood (2004), Human Anatomy & Physiology by Marieb (2004), Human Physiology by Silverthorn (2004), Human Physiology by Fox (2004), Environmental Physiology of Animals by Willmer et al. (2000), Eckert Animal Physiology (2001),Animal Physiology by Hill et al. (2004)

Laboratory Manuals:

There are two manuals for this course. *PhysioEx 8.0* which will be used for simulation-based exercises and the *Laboratory Manual for Biology 310 – Principles of Physiology* which will be used for more hands-on exercises. An additional handout will be distributed that covers the final laboratory class on Thermoregulation. Reading through the exercises prior to laboratory sessions will greatly enhance your ability to follow and critically respond to the laboratory material. Students are encouraged to take advantage of the *PhysioEx* software to explore simulation material both before and after class.

On-Line materials:

The U.S. National Library of Medicine maintains two excellent and relevant websites: **Pubmed** and **Medlineplus** (pubmed.gov and medlineplus.gov). Students are strongly encouraged to familiarize themselves with these sites and to use them to find material for their essays and other assignments. Pubmed is the best search engine for finding refereed journal articles and reviews in both animal and human physiology. Medlineplus is a good source for readable, summarized information on medical and physiological topics (and is a lot more reliable than Wikipedia!). Other useful and reliable sites include the **National Institutes of Health's** site (www.nih.gov) and the **Center for Disease Control** and Prevention's site (www.cdc.gov). **Please remember that information published on these sites is NOT equivalent to the primary literature. You will still have to find and cite primary sources to support and factual claims in your essays.**

Assessment:

Overall:

Grades for the **lecture component of the course will comprise 75%** of the overall grade for this course (or 300 of the 400 possible points). Grades for the **laboratory component will comprise 25%** (or 100 of the 400 possible points). Final course grades will be determined as follows:

100-90%=A, 89-80%=B, 79-70%=C, 69-60%=D, 59%-0%=F.

a) Section Tests & Exams:

There will be **three 1-hour section tests** and a **final exam** during the semester. **The section test** on which the student scores the highest will be worth **50 points,** the two lower scoring section tests will be worth **25 points each**. **The final exam will be worth 100 points**.

Section tests will test material covered in each of the three lecture course segments (with the exception of the final topic – thermal physiology). The final exam will follow a similar format to the section tests but will cover the entire lecture course content. The section tests are intended to provide students with feed-back and the opportunity to demonstrate and improve their understanding of the course material throughout the semester, so that they can excel in the final exam.

The section tests and the final exam will include multiple choice and short answer tests to test students' knowledge of specific information. They may also include un- or partially labeled diagrams of metabolic pathways to test students' knowledge of these systems. Multiple choice, short answer and diagrammatic questions will account for 50% of the marks available for any given test or exam. The tests and the final exam will also include essay questions in which students will be required to write a one to one and a half page essay describing clearly, concisely and correctly one or more physiological mechanisms or processes. These essay questions will account for 50% of the marks available for any given test or exam.

The three section tests and the final exam will be worth 200 points out of the course total of 400.

Makeup exam policy: Makeup exams will NOT normally be given. It is your responsibility to be at all scheduled tests & exams. Under exceptional circumstances (a valid absence) a makeup exam may be given but this is at the course instructor's discretion. Please notify the course instructor beforehand, if possible.

b) Essays:

Students will be required to write an 8 to 10 page essay on a physiological topic. **This essay will be worth 50 points**. Detailed essay instructions are available on the blackboard site in the assignments folder. **Please read the instructions carefully** as essays will not be accepted unless they conform to the formatting, length, citation and reference instructions given. Please also pay close attention to the deadlines given as marks will be deducted from late essays.

PRIZES: To recognize the exceptional level of effort that many students put into their essays, two prizes are awarded each semester. These prizes are for the **best essay** on an **animal physiology** topic and for the **best essay** on a **human physiology** topic. **Prize winners receive a signed certificate and a $25 book voucher from Barnes & Noble.**

The essay is due on: **Tuesday, the 4th of November 2008**

The essay will be worth 50 points out of the course total of 400.

c) Reading Assignments:

Students will be given four journal articles on different animal and human physiological topics to read during the semester. They will then be required to provide written answers to a series of ten short questions on each. Students will typically be given one-week to complete each assignment. Each assignment will be worth 12.5 points.

The reading assignments will be worth 50 points out of the course total of 400.

d) Laboratory:

Students will be required to complete and submit the exercises associated with each laboratory class in accordance with the instructions of the laboratory instructor. This will usually mean submitting the review sheet for any PhysioEx exercise at the end of the relevant lab. class and submitting a lab report that corresponds with the instructions in the manual for any lab. manual or other practical exercise. The review sheets for the **10 PhysioEx exercises** will be worth **5 points each for a total of** 50 points. The **5 lab. reports** for the four lab. manual exercises will be worth **10 points each for a total of 50 points**.

The laboratory section as a whole will be worth 100 points out of the course total of 400.

e) Extra Credit:

Physiological research on vertebrate animals and in particular humans is strictly governed by established legal and ethical guidelines. Reputable medical and scientific journals will only publish the results of studies that comply with these guidelines. Researchers who fail to comply with these guidelines are likely to be expelled from their university or research institution and to become ineligible for future research funding. Researchers have been fined, jailed and even executed for failing to comply with these standards. Institutions that fail to enforce these standards are usually fined, limited in the types of research they can do, limited in the types of funding they can receive and sometimes closed down completely. In short - any physiologist who wishes to work with humans or other vertebrates needs to be aware of the currently accepted legal and ethical framework for such work. **Accordingly, there are two extra credit opportunities available to Biology 310 students who wish to improve their knowledge of the ethical and legal guidelines for research involving humans and non-human vertebrates.**

Extra credit opportunity 1: humans

Students who take the National Institutes of Health's online course "Protecting Human Research Participants" **will earn an extra 4 points credit** (i.e. an extra 1% of your final grade), if, by **Thursday, 27 November,** they submit a printout of the certificate to the course instructor that shows that they have successfully completed all of the segments**.** The course can be found at: http://phrp.nihtraining.com/users/login.php

Extra credit opportunity 2: non-human vertebrates

Students who complete the introductory unit ("**working with the IACUC**") of the UAA Institutional Animal Care and Use Committee's training course **will earn an extra 4 points credit** (i.e. an extra 1% of your final grade) if, by **Thursday, 27 November,** they submit a printout of the certificate to the course instructor that shows that they have successfully completed all of the segments**.** The course can be found at: http://www.uaa.alaska.edu/research/ric/iacuc/training/index.cfm

Feedback:

If you have comments on this syllabus, the textbook, the lectures, the laboratory classes or any other aspect of the course, please do not hesitate to send them to me (Dr. van Tets, the course instructor) via email (afivt@uaa.alaska.edu) or to come and share them with me during my office hours. Doing this enables me to evaluate and respond to your problems during the semester and help you and your classmates directly.

You will also have the opportunity to provide feedback via the IDEA student ratings of instruction system. I strongly encourage you to use this system as fully as possible. The information provided via this system is confidential and is used to improve and evaluate this course and my teaching.

Good luck & Happy studying!

I hope you enjoy the course and find its content useful no matter where your future studies take you!

Ian van Tets
Course Instructor
Biology 310
Principles of Physiology
Fall 2008