

BIOLOGICAL SCIENCES 260
ANIMAL PHYSIOLOGY

Instructors: **Dr. George Delahunty** (Lecture, Section 002 lab)
Jackie Andrews (Section 001 lab)

FALL, 2009

The Animal Physiology course consists of three hours of lecture and one three-hour laboratory section per week. You are expected to attend all lectures and attendance in the laboratory is mandatory.

Class meetings:

Lecture	MWF:	10:30-11:30	(Hoffberger G59)
Labs	Tuesday: Section 001	8:30-11:30	(Hoffberger 127)
	Section 002	1:30-4:30	(Hoffberger 127)

Office hours (Dr. Delahunty): Room G48 Hoffberger
Monday 1:30-2:30
Wednesday 1:30-2:30
Friday 9:30-10:30
or by appointment

Course materials:

Text: *Animal Physiology: From Genes to Organisms*
by Sherwood, Klendorf, Yancy
Thomson Brooks/Cole Publishers (2005)

Other course materials include:

- a) A lab manual of all of the experimental protocols, to be distributed the first week of classes;
- b) Slides and diagrams of the physiological systems we will study will be posted on **Blackboard** (<http://blackboard.goucher.edu>). I strongly encourage you to print out copies of this material before lecture to facilitate your note-taking;
- c) Additional required readings, to be posted on **Blackboard**. These will be announced in lecture;
- d) Lecture and laboratory exams from the previous year will also be posted on **Blackboard**.
- e) Other Reference Texts on Library Reserve (Desk):
 - W.F. Ganong *Review of Medical Physiology*, 198 - 612 G198, 1987
 - Guyton *Medical Physiology*, 1981. 86

Grading:

Grades are based on the total number of points accumulated on formal lab reports, weekly results reports, lab exams, lecture exams and the final. Generally, no make-up exams are given in BIO 260. If one exam is missed the lowest score earned on any piece of work during the semester will be substituted for the missing test score. A grade of zero will be assigned if additional exams or the final exam are missed. The use of animals and specialized equipment in the laboratory make it extremely difficult to do any make up labs. Thus, a penalty is imposed on the laboratory grade if any labs are missed.

Lecture grades: Your grade in the lecture will be determined by the three lecture exams (100 pts each) plus the final (200 pts). Dates for these exams are in the lecture schedule. The lecture portion of your grade will be 5/7 of your final grade.

Laboratory grades: Your grade in the laboratory will be determined by a formal laboratory report (70 pts), ten weekly results reports (30 pts total) and the two laboratory exams (50 pts each). The weekly Results Reports must consist of your data in a proper figure or table with a descriptive legend. The weekly report should also include a brief summary of your results illustrating your understanding of the experiment. The weekly reports are due one week after you complete the lab. The dates for the laboratory exams and due date for the formal laboratory report are noted in the syllabus.

The formal lab report must follow the format of a research paper; the Biological Sciences research paper guide is available on Blackboard for you to reference. With certain exceptions, you may select any lab for your formal report, but you must choose one that yielded reliable data. You are expected to find two pertinent articles relating to the experiment you select, and these articles must be appropriately integrated and cited in the report as well as being listed in the reference section. Lab reports must be typewritten and submitted as hard copies with appropriate figures and tables. Electronic submissions are not acceptable. Substantial late penalties are imposed for work turned in past the announced due date. You will receive further instructions regarding the formal report in your laboratory class.

Grading Summary:

Lecture:	3 hourly exams	(100 points each)	300
	Final exam	(200 points)	200
Laboratory:	1 Lab report	(100 points) x 70%	70
	2 Lab exams	(50 points each)	100
	10 Weekly Reports	(10 pts each)	
	(10 x 10pts) x 30%		30
Total Points:			<hr/> 700

LABORATORY SCHEDULE

<u>Experiment No.</u>	<u>Date</u>	<u>Topic (points)</u>
1	September 8	Human Metabolic Rate, BMI and Body Composition (10)
2	September 15	Intestinal Absorption of Sugars and Amino Acids (10)
3	September 22	Endocrine Physiology – Rat Estrous Cycle (10)
4	September 29	Neurophysiology I (10)
5	October 6	Neurophysiology II
6	October 13	Physical Properties of Skeletal Muscle (10)
7	October 20	Mid - Semester Break
8	October 27	Lab Exam I and Respiratory Function in Humans (10)
9	November 3	Determination of Blood Volume (10)
10	November 10	Cardiovascular Function in Humans (10)
11	November 17	Advanced CV Function in Humans (10)
12	November 24	Thanksgiving week
13	December 1	Human Renal Physiology (10)
14	December 8	Lab Exam II

1 st lab Exam	October 27
Lab Report Due	November 17
2 nd Lab Exam	December 8

LECTURE SCHEDULE

<u>Date</u>	<u>Topic</u>	<u>Reading</u>
Week 1 Sept. 2	General Concepts of Physiology: Metabolism: BMR, SMR RQ, Energy Sources	Chapter 1 Chapter 15, p. 670-678
Sept. 4	Metabolism: Effect of Body Weight, Activity, Temperature	Chapter 15, p. 682-703
Week 2 Sept. 7	Labor Day, No Class	
Sept. 8	<i>Human Metabolic Rate, BMI and Body Composition</i>	
Sept. 9	G.I. Physiology: Motility, Secretions	Chapter 14, p. 612-626
Sept. 11	G.I. Physiology: Digestion and Absorption	Chapter 14, p. 626-660
Week 3 Sept. 14	Endocrinology: General Concepts & Pituitary	Chapter 7 p. 250-255; 264-270
Sept. 15	<i>Lab: Intestinal Absorption</i>	
Sept. 16	Endocrinology: Growth & Metabolism	Chapter 7, p. 271-276
Sept. 18	Endocrinology: Thyroid & Adrenal	Chapter 7, p. 277-293
Week 4 Sept. 21	Endocrinology: Pancreatic Function	Chapter 7, p. 292-302
Sept. 22	<i>Lab: Rat Estrous Cycle</i>	Chapter 16, p. 718-729
Sept. 23	Endocrinology: Calcium Regulation and Reproduction	Chapter 7, p. 303-313
Sept. 25	Reproduction & Hormone Action	Chapter 7, p. 256-260 Chapter 16, p. 729-757
Week 5 Sept. 28	Neurophysiology: Neuron Structure & Function	Chapter 4, p. 103-122
Sept. 29	<i>Lab: Neurophysiology I</i>	
Sept. 30	Exam I	
Oct. 2	Neurophysiology: Physical Concepts & Cell Physiology	Chapter 3, p. 95-101

Week 6	Oct. 5	Neurophysiology: RMP & A.P.	Chapter 4, p. 103-122
	<i>Oct. 6</i>	<i>Lab: Neurophysiology II</i>	
	Oct. 7	Neurophysiology: Conduction & Synapses	Chapter 4, p. 122-137
	Oct. 9	Neurophysiology: Integration & Plasticity	Chapter 4, p. 122-137
Week 7	Oct. 12	Muscle: Structure & Biochemistry	Chapter 8, p. 314-321
	<i>Oct. 13</i>	<i>Physical properties of Skeletal Muscle</i>	
	Oct. 14	Muscle: Excitation/Contraction Coupling	Chapter 8, p. 321-326
	Oct. 16	Muscle: Physical and Contractile Properties	Chapter 8, p. 328-342
Week 8	Oct. 19	MID-SEMESTER BREAK	
	<i>Oct. 20</i>	<i>MID-SEMESTER BREAK</i>	
	Oct. 21	Smooth Muscle	Chapter 8, p. 348-356
	Oct. 23	Respiration: Organs & Ventilation	Chapter 11, p. 462-484
Week 9	Oct. 26	Respiration: Alveolar Function & Ventilation/Perfusion	Chapter 11, p. 484-498
	<i>Oct. 27</i>	<i>Lab: Exam and Respiratory Function in Humans</i>	
	Oct. 28	Gas Transport: Respiratory Pigment & O ₂ Dissociation Curve: Factors that Influence Respiratory Pigments	Chapter 11, p.498-510
	Oct. 30	EXAM II	
Week 10	Nov. 2	Control of Respiration	Chapter 11, p. 510-518
	<i>Nov. 3</i>	<i>Lab: Blood Volume Determination</i>	
	Nov. 4	Overview of Circulation: Cardiac Structure and Function	Chapter 9, p.359-372
	Nov. 6	Cardiac Function: Mechanical & Electrical	Chapter 9, p. 372-386
Week 11	Nov. 9	Regulation of Cardiac Output	Chapter 9, p. 386-392
	<i>Nov. 10</i>	<i>Lab: Cardiovascular Function in Humans</i>	
	Nov 11	Hemodynamics	Chapter 9, p. 392-407

Week 12	Nov. 16	Capillary Exchange & Lymphatics	Chapter 9, p. 407-419
	<i>Nov. 17</i>	<i>Lab: Regulation of Blood Pressure in the Rat</i>	
	Nov. 18	Control of Circulation to Specific Tissues	Chapter 9, p. 419-425
	Nov. 20	Renal Function: Anatomy & Nephron Function/Fluid Volume	Chapter 12, p. 521-534; 551-562
Week 13	Nov. 23	Autoregulation of Renal Function	Chapter 12, p. 536-546
	Nov. 24	No lab	
	Nov. 25-29	THANKSGIVING BREAK	
Week 14	Nov. 30	Plasma Clearance, Tubular Reabsorption & Secretion	Chapter 12, p. 547-551
	<i>Dec. 1</i>	<i>Lab: Human Renal Physiology</i>	
	Dec. 2	EXAM III	
	Dec. 4	Acid Base Balance	Chapter 13, p. 595-609
Week 15	Dec. 7	Adaptations to High Altitude	
	<i>Dec. 8</i>	<i>Lab: Exam</i>	
	Dec. 9	Adaptations to Diving	