

### **I. Course Description: Principles in Human Physiology**

This course is designed to provide students with an understanding of the function & regulation of the organ systems of the body and physiological integration of the systems to maintain homeostasis. Course content will include neural & hormonal homeostatic control mechanisms, and study of the musculoskeletal, circulatory, respiratory, digestive, urinary, immune, reproductive, and endocrine systems. The response of the body to exercise and integration of organ system function to meet the demands of exercise performance will be emphasized throughout the semester.

Prerequisite courses: Biology 3050, 3059, or 3058 or similar physiology course. It is assumed that all students enrolled in this course have completed the required prerequisite courses and have knowledge of cell biology, molecular cell mechanisms and basic concepts of physiological control mechanisms as taught in Biology 3058 (previously 3050 or 3059).

Format: Lecture      Credit: 4 semester hours      Room: Wilson, 214

### **II. Course Coordinator and Instructor**

Ruth Clark, P.T., Ph.D.

Phone: voice mail: 314-286-1431

Email: clarkru@wustl.edu *Please indicate Bio 328 in the subject box*

Medical School Office: Program in Physical Therapy

Washington University School of Medicine

4444 Forest Park Blvd., Room 1112

Danforth Office: Wilson, Room 312

**OFFICE HOURS: open door office hours start Feb. 2, 2009**

Wilson Office hours:	Monday	11:00 AM - 12:30 PM open door
	Wednesday	3:15 – 4:30 PM open door

#### Graduate Teaching Assistants

Kai-Chien Yang

Vanessa Ridaura

#### Undergraduate Teaching Assistants

Bo Lee

Silvia Kim

Elizabeth Messer

#### Academic Mentor

David Zhou

### **III. Course Goals and Objectives**

The primary goal of this course is to offer an in-depth presentation of the function of the major organs and organ systems of the human body. The course is designed to expand physiological concepts presented in prerequisite courses. It is expected that the student understand the unique role of each organ and organ system in maintaining health. Students should be able to describe the functions of the distinctive cells that comprise each major organ and when appropriate define the role of physiological functional units. Case studies will be provided to enhance the integration of material presented in class.

Upon completion of this course the student should be knowledgeable in the following areas of bodily function:

- ✓ Integration of the organ systems to maintain constancy of the internal environment
- ✓ Regulation of homeostasis by neuronal, endocrine and local chemical messengers
- ✓ Role of the Autonomic Nervous System in regulating organ function
- ✓ Adaptive responses to exercise and the role of exercise in maintaining health
- ✓ Adaptive physiological responses to stress, infectious organisms and toxins
- ✓ Changes in bodily function through the life span

#### IV. Required Textbooks:

Widmaier, Raff, & Strang: Vander, Sherman, and Luciano's, Human Physiology, The Mechanisms of Body Function, eleventh edition, McGraw Hill, 2008.

McArdle, Katch & Katch, Essentials of Exercise Physiology, third edition, Lippincott Williams & Wilkins, 2006.

#### V. Exams

Exam format is objective and exam answer keys are graded with the use of a computer program. Exam questions will include material presented in lecture, assigned chapter readings, thought questions at end of chapters, and case studies distributed during class.

Students are to mark their answers (#2 lead pencil) on a paper scantron form which will be graded by computer software. You must include your name and 6-digit student ID# on the scantron form. Individual exam scores will be based solely on responses marked on the scantron form.

Students are expected to take **ALL** four exams on the scheduled dates indicated below. No make-up exams will be given except in situations of pre-arranged excusable absence, significant illness or grave family emergencies. In the event of an emergency you must call my voice mail at 314-286-1431 no later than 12:00 P.M. on the day of the exam and give reason for absence and a phone number to contact you.

Make-up exams will be allowed in situations of family tragedy, serious illness or other grave situations as determined by the course instructor. A note from student health or physician is required if you miss the exam for reason of illness. All pre-arranged excusable absences needed to be approved by R. Clark at least 2 weeks prior to the scheduled exam. Travel for Washington University sponsored events will be accommodated however the student must provide official documentation from coach or WU sponsor.

#### Missed Exams

If the circumstance/reason for missing the exam is determined to be non-excusable by the course coordinator the following action may occur:

1. a make-up exam may be denied and the student will receive a zero for that exam
2. the student may be required to take an alternate form of the exam and/or
3. the student may be given a grade reduction for the exam in question.

#### Review of Exam Questions

Review of test questions for point alterations will be considered if the student contacts R. Clark within two weeks following the return of each exam. Exam questions will not be returned to the students however the exams with answer key will be available in the classroom for review the day exam results are returned and the following class period. Exam answer keys may also be reviewed during R. Clark's office hours.

<b>Exam Dates:</b>	Exam 1:	Wednesday, February 11	1:00-3:00 PM	Wilson 214
	Exam 2:	Wednesday, March 4	1:00-3:00 PM	Wilson 214
	Exam 3 :	Wednesday, April 8	1:00-3:00 PM	Wilson 214
	Exam 4:	Monday, May 4	6:00-8:00 PM	Room TBA

**Exams 1-3** are worth 100 points each.

**Exam 4** is worth 200 points; 100 points from the material in the last unit of the course plus 100 points of comprehensive material on the principles of exercise physiology to include the response of the body to an acute bout of exercise and training adaptations. Students will be provided with review objectives, questions, and case examples to prepare for the final comprehensive portion of exam 4.

### Academic Honesty

It is expected that all students help to maintain an environment of academic honesty. The following behaviors are strictly forbidden during the administration of the exam: talking, wearing of hats with bills, checking, sending, and answering of cell phone messages including text messages and passing of papers or notes. Students must keep their eyes on their own paper.

All students are required to hand-in the packet of test questions with their name and 6-digit student ID number clearly indicated on each page of the exam. Failure to hand-in the test questions with name and ID number will result in a zero for that exam. It is the responsibility of the student to make sure that the answers he/she wants graded are clearly marked on the scantron sheet with a #2 lead pencil.

*Exam results will be returned in class approximately 1 week after exam date. You must present student ID to receive your exam results. Your exam results will include each student's in-progress course grade including + or - grade if present.*

### **VI. Grading Criteria**

Final grade in the course will be assigned according to the **numerical average** computed from the total points accumulated from the completion of all four exams. Grades will be assigned according to the following criteria:

A's = 88.5-100

B's = 78.5-88.4                      + and - will be assigned at the end of each grade range

C's = 68.5- 78.4

C - = 65.0-68.4

D's = 58.5-68.3

F = 58.4 and below

Pass or Fail Option: Students must have an average 58.5 or higher for a passing grade.

*Please note: there will be no grade inflation at the end of the course. The course coordinator remains blind to all grades until after they have been officially submitted to Web Fac.*

### **VII. Course Web Site**

<http://www.nslc.wustl.edu/courses/Bio328/bio328.html>

All handouts, study guides (lecture objectives) and case studies will be placed on the course web site.

### **VIII. Help Sessions and Tutors**

Teaching Assistant Help Sessions: TBA

The TAs will conduct regularly scheduled help sessions. Help sessions are optional and are designed to assist students with comprehension of the material presented in class and case studies.

Help sessions are held in the Natural Sciences Learning Center (NSLC) in the department of Biology. These sessions are designed to clarify content from lecture, assigned reading and case studies. Schedule of Help Sessions will be posted on the course web site.

Additional Office Hours and TA Help Sessions will be scheduled prior to each exam. Please check the course web site and email notifications from R. Clark for updates on additional sessions.

### **IX. Lecture Format**

The majority of class lectures will be presented on the chalkboard. The course web site will contain lecture and/or topic outlines (2007 word document format). All course postings will comply with copyright law; therefore no copyrighted figures will be posted. It is the individual student's option to print a copy of the lecture outlines. Class presentation of lecture topics may not precisely follow posted outline however the posted outline will serve as a good review of important concepts.

**X. Course Schedule and Assigned Reading**

Class will meet Mondays and Wednesdays from 1:00-3:00 P.M. Attendance is highly recommended.

<b>Date</b>	<b>Lecture Topics</b>	<b>Chapter Reading</b>	
		<b>Vander 11 ed</b>	<b>Exercise Text</b>
M, Jan 12	Introduction Organization of the Human Body The Extracellular Matrix	1, (2, 3, 4)	
W, Jan 14	Autonomic Nervous System Somatic Motor System	6; D 6; D	11; part 1
<i>M, Jan 19</i>	<i>MLK Holiday</i>		
W, Jan 21	Principles of Hormone Action Hypothalamus-Pituitary Axis	11; A 11; B	12; p. 402-415 12; p. 402-415
M, Jan 26	Thyroid Hormone Hormones of the Adrenal Cortex	11; C 11; D	12; p. 423-430 12; p. 423-430
W, Jan 28	Growth Hormone Parathyroid Hormone & Calcium Homeostasis Adipose Cells	11; E 11; F	12; p. 423-430 12; p. 402-415
M, Feb 2	Skeletal Muscle	9	11; part 2 14
-----End of material for exam 1-----			
W, Feb 4	Smooth Muscle , Cardiac Muscle Cardiovascular System	9; B 12; A-C	10
M, Feb 9	Cardiovascular System	12; A-C	10
<b>W, Feb 11</b>	<b>EXAM 1: 100 points 1:00 -3:00 PM</b>		
M, Feb 16	Cardiovascular System	12; A-D	10
W, Feb 18	Cardiovascular System Cardiovascular Response to Exercise	12; A-D 12; E	10 10, 13
M, Feb 23	Cardiovascular Disease	12; E	17; p 645-661
W, Feb 25	Blood / Function of Red Blood Cell Hemostasis	12; F 12; F	15; p 547-549
-----End of material for exam 2-----			
M, March 2	Respiratory System	13	9
<b>W, March 4</b>	<b>EXAM 2: 100 points 1:00 -3:00 PM</b>		
<i>M-W, March 9-13</i>	<i>Spring Break</i>		

Date	Lecture Topics	Chapter Reading	
		Vander 11 ed	Exercise Text
M, March 16	Respiratory System	13	9
W, March 18	Altitude Physiology / Physiology of Space Flight Introduction to Basic Renal Mechanisms	13 14; A	15; part 3
M, March 23	Sodium, Potassium & Water Balance Thermoregulation	14; B 16; B	15; part 1, 2
W, March 25	Acid-Base Balance Renal Disease	14; C, D	6; p 204-206 9; p 319-321
M, March 30	Gastrointestinal System	15	
-----End of material for exam 3-----			
W, April 1	Function of the Liver Function of the Pancreas	15 16; A	12; p 415-424 12; p 428
M, April 6	Integration of Metabolism Flow of Fuels during Exercise Metabolic Adaptations to Exercise Training	16; A	16; part 1, 3
<b>W, April 8</b>	<b>EXAM 3: 100 points 1:00 -3:00 PM</b>		
M, April 13	Development of Sexual Differentiation Male Reproductive Physiology	17; A 17; B	12; p 426-427
W, April 15	Female Reproductive Physiology Genesis of White Blood Cells Inflammation	17; C 18	
M, April 20	Mechanisms of Immunity	18	
W, April 22	Allergy / Principles of Organ Transplantation Aging	18	17
-----End of material for exam 4-----			

*Course schedule is subject to change; coverage of lecture topics may vary slightly. Exam dates will remain as scheduled and will not change.*

**Exam 4: Monday; May 4, 6:00-8:00 PM**

**Exam 4:** 200 points total; 100 points + 100 points comprehensive primarily exercise physiology  
Total points in the course = 500