

Anatomy and Physiology Laboratory

Instructor: Shu-Yuan Cheng, Ph.D.

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Office hours: By appointment

Course description:

The course will provide students with a hands-on exploration of the structure and physiology of the human body by using various dissecting models, sheep organs, microscope slides, and preserved rats. There will also be exploration of human physiology and physiological experiments on, and dissection of, live frogs. The course will begin with a discussion on the ethics of live dissections and the use of animals in scientific and medical research. The course will then continue with an introduction to anatomy and its various branches. The course will connect anatomical structure to physiological function and then to pathophysiology of special topics including pregnancy, injury, aging, and disease states.

Learning Objectives:

Students that complete this course will be able to:

Reasoning

- Apply knowledge of anatomy and physiology to specific problems and cases
- Analyze the process and mechanics of human physiology
- Explain the relationship between human anatomy and physiology
- Explain how body systems work together to maintain homeostasis

Knowledge

- Understand the ethical concerns and issues surrounding the use of animals in scientific/medical research and teaching
- Identify the basic anatomical structures of the human body
- Describe the major organ systems of the human body and their physiological functions
- Describe the physiological functions of human body systems
- Identify the levels of structural organization that make up the human body and explain how they are related

Practical skills

- Research and analyze information about selected topics in anatomy and physiology, such as cardiovascular functions.
- Demonstrate competent analytical skills to perform physiological experiments
- Demonstrate competent skills in animal tissue and organ dissection and preparation
- Show proficient ability to analyze and interpret data from physiological experiments

- Show competence in applying fundamental anatomy knowledge to comprehend the pathological mechanism of diseases

Texts/equipments:

Laboratory Manual (suggested):

[Human Anatomy & Physiology Laboratory Manual, Rat Version](#) by Elaine N. Marieb and Susan J. Mitchell

Equipments

Dissection kit (optional)

Lab coat

Goggles

Laboratory sessions will require the entire scheduled period. You will be responsible for cleaning up before you leave lab. Therefore, do not expect to be out of lab before the scheduled time. You will need to read the relevant text material and the appropriate lab material *before* you come to class or lab. You will need your textbook and all lecture handouts during all class meeting. You will need your textbook, your lab manual, and other lab materials with you during all lab meetings. Students should be aware that, because the dissection of preserved organs and whole intact animals is the major focus of Bio399 (BIO356), students that are not comfortable performing these dissections will not able to complete the course.

Statement of the College Policy on Plagiarism:

- * Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.
- * It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentations) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.
- * Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has free guides designed to help students with problems of documentation.
- * This course will use turnitin.com for all written assignments.
- * Plagiarism will result in an automatic "zero" for the assignment, and the instructor reserves the right to report the academic dishonesty to the college disciplinary mechanisms.

Americans with Disabilities Act (ADA) Policies

Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at L66 in the new building (212-237-8031). It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor."

Blackboard: Important course announcements, reading assignments, lecture notes, review questions, a discussion forum for Q and A, and other resources will be posted to the course on Blackboard. Please check regularly. Furthermore, **students are responsible** for checking their **John Jay e-mail account** regularly for important announcements. Contact DoIT, **not** your Bio instructor, for help with e-mail or Blackboard.

Grades: The grade for Bio399 (BIO356) is a composite of two practical exams, worth 20% each; 4 in-class quizzes, worth a combined total of 20%; and four (4) physiological experiment reports, worth 10% each.

Grading Scale: The grading scale is the official grading scale for this course. There will be no exceptions to this scale and grades will not be rounded, except as explained here: following all computations, the grade will be rounded to the nearest tenth of a point in Microsoft Excel (one decimal place, e.g., 97.2%). This is the final grade and no further manipulations will be made. The scale will then be strictly used. This means that a 72.949% is a "C-" and a 72.950% is a "C." These calculations are done by the computer so there are no judgment calls or "leniency."

93.0 and above	A
90.0 - 92.9	A-
87.0 - 89.9	B+
83.0 - 86.9	B
80.0 - 82.9	B-
77.0 - 79.9	C+
73.0 - 76.9	C
70.0 - 72.9	C-
67.0 - 69.9	D+
63.0 - 66.9	D
60.0 - 62.9	D-
below 60.0	F

Students that have a genuine conscientious or moral objection to the use of live frog and choose not to participate in those laboratories will be excused from direct participation and may choose whether or not to be present while the other students complete the laboratory work. Students with such an objection must present this objection in the form of a written statement at least two weeks prior to the beginning of the frog lab. The student will make up the work with a simulated dissection program and the writing of an additional graded laboratory report assigned by the instructor. No penalty points will be deducted, per se, but students will be responsible for the same exam and must thus get notes taken by other students in order to prepare.

You must check Blackboard and your John Jay E-mail account regularly.

You are responsible for any and all course information, assignments, announcements, and communication that occurs through blackboard and/or your email account.

Important Policies

Course Attendance: As this course is practical in nature, you are required to attend the class sessions. An attendance sheet will be circulated during class. It is your responsibility to sign the sheet *during* class. You will not be permitted to sign the attendance sheet after the class has been dismissed. You will be allowed one absence with no required documentation. However, beginning with the second undocumented absence, your final course grade will be penalized by five percentage points (5%) for each undocumented absence, in addition to the lost points incurred from missing any quizzes or assignments. Arrivals later than five minutes after the start of class will count as a one-half absence.

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Exams: There will be two practical exams: a midterm, and a final. The midterm will cover the first half of the course and occur as scheduled in the syllabus. The final exam will cover the second half of the course. The two exams will each form 25 points of the possible 100 points for the course grade.

Quizzes: There will be ten (10) in-class quizzes covering previous lab subject. These quizzes will be announced at least one class period ahead of time. The quiz grade will be combined to form 30 points of the possible 100 points for the course grade.

Physiological experiment reports: There will be two (2) papers covering specific physiological experiments. More detail will be given in class. These papers will be graded and checked for plagiarism through turnitin.com – thus digital copies **MUST** be provided by email or Blackboard. The grades of reports will be combined to form 20 points of the possible 100 points for the course grade.

Course Reading List

Required Texts:

Laboratory Manual: Elaine Marieb, Susan Mitchell and Linda Kollett 2011. *Human Anatomy and Physiology Laboratory Manual: Rat Version*. ISBN-13: 9780321644152

Suggested reading text:

Institute of Laboratory Animal Research (2011) Guide for the Care and Use of Laboratory Animals: Eighth Edition

Laboratory Schedule

(14 sessions + final exam)

8/29/2012	Lesson 1: Introduction to Anatomy and Physiology: Ethics and terminology	<ol style="list-style-type: none">1. Ethics of live dissection and animal use: the three "R" (replacement, refinement, and reduction) and other ethical concepts about animal use.2. Define and outline the organization of human anatomy and physiology.3. Anatomical terminology
9/05/2012	Lesson 2: The classification of tissue	<ol style="list-style-type: none">1. Cell and tissue --- histology2. Types of tissues and their origins
9/12/2012	Lesson 3: The Skeletal System I	<ol style="list-style-type: none">1. Axial skeleton and appendicular skeleton2. Functions, structure and histology of bone tissue3. Bone formation and growth4. Divisions and types of bones
9/19/2012	Lesson 4: The Skeletal System II	<ol style="list-style-type: none">1. Skull2. Development of skeletal system3. Joint classifications4. Types of movement
10/03/2012	Lesson 5: The Muscular System	<ol style="list-style-type: none">1. Types, functions and properties of three types of muscle tissue (skeletal, smooth, and cardiac muscles)2. The relationship between bones and muscles --- origin and insertion
10/17/2012	Lesson 6: Muscular Physiology Physiology report 1 (Due 10/31/2012)	<ol style="list-style-type: none">1. Muscular physiology2. Contraction and relaxation of muscle fibers3. Muscle metabolism and control of muscle tension
10/24/2012	Lesson 7: The Mid-term	In class practical exam

10/31/2012	Lesson 8: Nervous system Physiology report 2 (Due 11/14/2012)	<ol style="list-style-type: none"> 1. The principal anatomical and functional features of the brain (sheep brain) 2. Electroencephalogram (EEG) 3. Structures, basic functions and organization of the nervous system. 4. Histology of nervous tissue 5. Electrical signals of neurons, signal transmissions, and neurotransmitters 6. The principal anatomical and functional features of the spinal cord, the meninges, and the vertebral column.
11/7/2012	Lesson 9: Ear, Eye, and Nose	<ol style="list-style-type: none"> 1. The detailed anatomy and physiology of the special senses, including the eyes, ears, and nose 2. Hearing test 3. Eye examination
11/14/2012	Lesson 10: The Cardiovascular System Physiology report 3 (Due 11/28/2012)	<ol style="list-style-type: none"> 1. The Cardiovascular System: the Heart <ol style="list-style-type: none"> a. The major anatomical and physiological functions of the heart b. The location and surface features of the heart, structures and function of the heart, circulation of blood, the cardiac muscle, and the conduction system. c. Disorders and clinical applications are discussed in detail 2. Cardiovascular Physiology --- electrocardiogram (EKG), and cardiac output (stroke volume, heart rate, and regulation) 3. The functions and physical characteristics of blood: <ol style="list-style-type: none"> a. Red blood cells, white blood cells and platelets. b. Hemostasis and Hemostatic Imbalances c. Blood Groups and Blood Types
11/21/2012	Lesson 11: The Respiratory System Physiology report 4 (Due 12/5/2012)	<p>A detailed analysis of the structure and physiology of the organs of respiration.</p> <ol style="list-style-type: none"> a. The mechanisms involved in pulmonary ventilation, compliance, airway resistance, breathing patterns and modified respiratory movements, pulmonary air volumes and capacities. b. The exchange of respiratory gases, gas laws, gaseous exchange during external (pulmonary) and internal (tissue) respiration. c. The transport of oxygen and carbon dioxide, and the factors that control respiration.

11/28/2012	Lesson 12: The Digestive System	<ol style="list-style-type: none"> 1. The anatomy, histology, mechanical and chemical digestive processes of the gastrointestinal (GI) tract and the accessory organs of digestion. 2. The nervous and hormonal mechanisms regulating control of secretion in the digestive organs. 3. Disorders of the digestive system described include dental caries, periodontal disease, peptic ulcer disease, diverticulitis, colorectal cancer, hepatitis, and anorexia nervosa.
12/5/2012	Lesson 13: The Urinary System	<p>The anatomy and physiology of the urinary system; its role in maintaining homeostasis of blood composition, volume, pH, and pressure; and its importance as an excretory system.</p> <ol style="list-style-type: none"> a. The role of the kidneys in filtering blood and restoring selected amounts of water and solutes to the bloodstream. b. The stages of urine formation c. The mechanisms of urine dilution and urine concentration. d. The structure, histology, and physiology of ureters, urinary bladder, and urethra e. Homeostasis, disorders, and clinical applications of the urinary system
12/12/2012	Lesson 14: The Reproductive System	<ol style="list-style-type: none"> 1. The anatomy and physiology of the male and female reproductive systems. 2. The effects of the endocrine system in the male and female systems. 3. The developmental anatomy of the reproductive system is covered followed by the effects of aging. 4. The disorders and clinical applications of the reproductive systems. 5. Pregnancy.
TBA	Lesson 15: The Final Exam	In class practical exam