

BRAZOSPORT COLLEGE
LAKE JACKSON, TEXAS

SYLLABUS for BIOLOGY 2302 Lecture
HUMAN ANATOMY AND PHYSIOLOGY II
By J. James, fall 2015

Catalog Description:

This 3-credit course is the second half of a two-semester series in human anatomy and physiology. Students will study the structure and function of the human body emphasizing the circulatory, lymphatic, immune, respiratory, digestive, urinary, and reproductive systems. Through a variety of laboratory activities students will have the opportunity to learn the anatomy of these organ systems and participate in activities which demonstrate key concepts associated with these organ systems.

Prerequisite: BIOL 2301(3-3) [2607065124]

Textbook:

Marieb & Hoehn. Human Anatomy and Physiology, 10th edition, Pearson Publishing, 2016, ISBN- 978-0-321-92704-0. The 9th or 8th edition of the same text is equally good. Page numbers and figure numbers will vary slightly but info content is 99% the same.

Required course materials are available at the Brazosport College bookstore, on campus or online at <http://www.brazosport.edu/bookstore>. A student of this institution is not under any obligation to purchase a textbook from the college bookstore. The same textbook is/may also be available from an independent retailer, including an online retailer.

*Students may choose to use an alternate text or even a variety of online resources. However this course has been designed on the assumption the student has access to the aforementioned text.

I. GENERAL COURSE OBJECTIVES

This course is designed to follow BIOL 2401. It continues to build the foundation for those pursuing degrees in a variety of health-related professions. It is a requirement for BSN and ADN degrees and is a prerequisite for many courses in many health-related career fields. The course continues to guide students in their study of anatomical terminology and physiological principles of the human body. The course is extensive and requires considerable time and effort on the part of most students for successful completion. Students will be expected to learn relevant terminology, explain physiological processes in written essays, and use critical thinking skills to draw conclusions and predict physiological responses from information presented.

The course begins with a study of blood and the cardiovascular system and progresses on through the lymphatic, immune, respiratory, digestive, urinary, and reproductive systems. The operation of various negative and positive feedback mechanisms is emphasized throughout.

Weekly laboratory activities are designed to complement and coincide with lecture topics. Laboratory activities will include use of various organ system models, group activities, and dissections of preserved or fresh specimens of hearts, lungs, etc. No live animal experiments are used. The students will be guided through the structural anatomy of the organs and the physiological processes involved in each organ system.

The vast majority of students in A&P II will be those who just completed A&P I and who have career goals in the field of nursing. A few will have career goals in health-related fields such as physical or occupational therapy, dentistry, pharmacology, medical school, nutrition, exercise physiology, etc. Many references will be made to information learned in A&P I. Most students agree that A&P II is more difficult than A&P I and that the good study habits acquired in A&P I are essential for survival in A&P II.

II. LEARNING OUTCOMES

1. Students will demonstrate knowledge of the cardio-vascular system and control, including: blood, circulation, tissue perfusion and capillary exchange, cardiac muscle fibers, the intrinsic conduction system, and circulation through the heart.

Exam 1

2. Students will demonstrate knowledge of the roles of various cells and chemical substances involved in our nonspecific and specific defense responses.

Exam 2

3. Students will demonstrate knowledge of the respiratory system, including: pulmonary ventilation, gas transport, internal respiration, and respiratory control.

Exam 3

4. Students will demonstrate knowledge of fluid and electrolyte balance, including: pH imbalances causes and cures, interpretation of ABG's, fluid compartments and shifts, and feedback and control mechanisms.

Exam 4

5. Students will demonstrate knowledge of the reproductive system, including the hormonal controls of the ovarian and menstrual cycles, and pregnancy and childbirth

Exam 5

III. LECTURE TOPICS

1. Erythrocytes (RBCs), Structural Characteristics, Hemoglobin. Production of RBCs (Erythropoiesis), Fate and Destruction of RBCs, Regulation of Erythropoiesis (Homeostasis)
2. Anemias & Septicemia, Leukemia, Thalassemias, Hemostasis Sequence of Events, Clot Retraction and Fibrinolysis, Preventing undesirable clotting
3. Hemostasis (cont'd), Disorders of Hemostasis, Clinical applications, Properties of Cardiac Muscle Fibers, Mechanism & Events of Contraction
4. Setting the Basic Rhythm, Intrinsic Conduction System, Autorhythmicity, Clinical Applications, The Cardiac Cycle, Systole vs. Diastole, EDV vs. ESV
5. Cardiac Output, Regulation of Stroke Volume, Preload, Afterload, & Contractility, Regulation of Heart Rate, Modifying the Basic Rhythm (a.k.a. Extrinsic Innervation), ANS Regulation, Chemical Regulation, Other factors and Congestive Heart Failure
6. Physiology of Circulation, Maintaining Systemic Blood Pressure, Short-Term Mechanisms, Neural Controls, Chemical Controls, Long-Term Mechanisms, Renal Regulation
7. Tissue perfusion, Local Regulation of Blood Flow at tissues, Blood Flow in Special Areas, Capillary Dynamics and Circulatory Shock Stages
8. INNATE (Nonspecific) IMMUNITY, First Line of Defense: Surface Membrane Barriers, Second Line of Defense: Nonspecific Cellular and Chemical Defenses, Other terms: mast cells, perforins, leukocytosis, diapedesis, chemotaxis, and pyrogens, fever: Explain how a mild or moderate fever is beneficial.
9. ADAPTIVE (Specific) IMMUNITY, LYMPHOCYTES, Immunocompetence: Positive and Negative Selection, B cells and T cells
10. ANTIGEN-PRESENTING CELLS (APCs), Antigens and MHC/Antigen Complexes, THE HUMORAL IMMUNE RESPONSE - via B CELLS and ANTIBODIES, Activation, Clonal Selection yields Plasma cells and Memory cells, Antibodies (effects of...), Immunological Memory, Antibody Production in Primary and Secondary Responses, Vaccines
11. THE CELL MEDIATED IMMUNE RESPONSE - via T CELLS, T cell Activation, Clonal Selection of T cells, Helper Ts, Cytotoxic Ts, Suppressor Ts, Memory Ts
12. Antibiotics, Transplant Rejections and Immunosuppression, AIDS due to HIV, Autoimmune Diseases, Hypersensitivities, Immediate Hypersensitivities, Anaphylaxis, Anaphylactic Shock, and Atopy, Delayed Hypersensitivities
13. MECHANICS OF BREATHING, PRESSURE RELATIONSHIPS IN THE THORACIC CAVITY, Atmospheric (a.k.a. barometric), Intrapulmonary (a.k.a. alveolar), Intrapleural, Lung Recoil due to lung elasticity, Surface tension of alveolar fluid
14. PULMONARY VENTILATION: INSPIRATION AND EXPIRATION, Boyle's Law (a.k.a. The General Gas

Law), Inspiration, Surface tension of pleural fluid, Lung Compliance, Expiration, Clinical Applications: Atelectasis, pneumothorax, and IRDS

15. DALTON'S LAW OF PARTIAL PRESSURES, HENRY'S LAW, GAS EXCHANGES BETWEEN BLOOD, LUNGS, AND TISSUES, External Respiration, Respiratory membrane, Ventilation – Perfusion Coupling, Internal Respiration
16. TRANSPORT OF RESPIRATORY GASES BY BLOOD, O₂ Transport: affinity, saturation, oxyhemoglobin, deoxyhemoglobin, Effects of P_{O2}, P_{CO2}, temperature, and pH on affinity, Carbon monoxide poisoning, Cyanosis, CO₂ Transport: carbaminohemoglobin, carbonic acid, bicarbonate ions, and carbonic anhydrase, The CO₂ – pH “see-saw” relationship
17. CONTROL OF RESPIRATION, Control Centers, Genesis of the Respiratory Rhythm, Hyperventilation & Hypoventilation (compensatory vs. noncompensatory), Factors Influencing Rate and Depth, Influence of Higher Brain Centers, Chemical Factors
18. CO₂ (and therefore pH of CSF), Arterial Blood pH, O₂
19. Uses of cholesterol, Cholesterol Transport, Lipoproteins, Chylomicrons, VLDLs, LDLs, HDLs, Factors Influencing Plasma Cholesterol Levels
20. Regulation of Body Temperature, Mechanisms of Heat Exchange, The Control Center = Hypothalamus, Heat Promoting Mechanisms, Heat Loss Mechanisms
21. Hyperthermia, Heat Exhaustion, Heat Stroke, Fever
22. Glomerular Filtration, The Filtration Membrane, Net Filtration Pressure, Glomerular Filtration Rate, Clinical Applications – What if..., Regulation of NFP and therefore GFR, Intrinsic Controls (Renal Autoregulation), Extrinsic Controls (Sympathetic stimulation and Hormonal Controls)
23. Regulation of ECF (and therefore Urine) Concentration and Volume, The Countercurrent Multiplier and Exchanger, Formation of Dilute urine, Formation of Concentrated Urine, Diuresis and Diuretics, Solvent Drag (not in text), Renal Clearance (a.k.a. Plasma Clearance), Tubular Maximum (not in text), Micturition
24. pH and Acid-Base Balance, Know the concept of pH, pH values for blood, sources of H⁺, pH values for urine, and how each of the 3 compensatory mechanisms works to maintain proper pH of the blood.
25. Fluid Compartments - Identify the fluid compartments and the percentages of fluids they contain, Composition of Body Fluids - Learn which components are most abundant in each compartment, Osmolality – how to predict it.
26. Fluid Movement Among Compartments, Water Balance, Input vs. Output, Thirst, Dehydration, Hypotonic hydration, Edema
27. Electrolyte Balance - Potassium, Calcium, Sodium, Acidosis: Criteria, Causes, and Effects, Respiratory Acidosis, Metabolic Acidosis, Alkalosis: Criteria, Causes, and Effects, Respiratory Alkalosis, Metabolic Alkalosis, The ABCs of ABGs

28. The following lab topics on reproduction are fair game for the lecture exam, Male Anatomy and functions, Female Anatomy and functions, Fertilization, Implantation, Placentation, Hormones of Pregnancy, Parturition – the hormonal controls
29. The Ovarian Cycle, Events and Phases, Hormonal Regulation by FSH and LH (Know the source, target tissue, effect, & stimulus for release for each H.)
30. The Uterine (Menstrual) Cycle, Events and Phases, The Endometrium, Effects of estrogen and progesterone (Know the source, target tissue, effect, & stimulus for release for each H.), Menses
31. PMS Premenstrual Syndrome, Pregnancy Related Topics Preeclampsia and Eclampsia, Lactation, Occlusion of Fetal Blood Vessels and Vascular Shunts, Ventricular septal defect VSD, Atrial septal defect ASD, Neural tube defects: Anencephaly and Spina bifida, Respiratory Distress Syndrome (RDS) in premature infants
32. Stages of Labor, Placenta previa, Placenta abruptio, Menopause

IV. EXAMS and GRADING

- There will be five regular exams plus a comprehensive final exam.
- If you foresee a conflict you may make arrangements to take the exam earlier than scheduled. There are no makeups “after the fact” for exams missed. *However your score on the comprehensive final may be used to replace one lower exam score. In this case the final exam score is effectively counted twice.
- Regular exams typically consist of terminology definitions, MC, and essay questions. Exam questions will focus on topics listed in the Study Guides provided by the instructor. The majority of these topics are covered efficiently by your instructor in class.
- The final exam is MC only.
- Regular exams and the final exam are weighted equally. Each has the same value.
- Your instructor may require or offer additional assignments at his discretion on a per semester basis.
- A straight grading scale will be used so that:
 - 90% and above - A
 - 80% and above – B
 - 70% and above – C
 - 60% and above – D
 - Below 60% - F

V. COURSE POLICIES

A. ADDITIONAL HELP

Supplemental Instruction

Supplemental Instructors (SIs) are former students who have done well in the course. They host weekly learning/review/study sessions to help you master the terminology and concepts and do well in the course. Students who participate regularly in SI sessions typically score 10% higher on lab quizzes and 10% higher on lecture exams. All SI services are at no cost to you.

B. STUDENTS WITH DISABILITIES

Brazosport College is committed to providing equal education opportunities to every student. BC offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. Please contact Phil Robertson, Special Populations Counselor, 979-230-3236 for further information.

C. WITHDRAWAL POLICY

The Brazosport College Biology Department believes attendance in both lecture and lab is critical for the comprehension of material. Therefore, if student absences exceed requirements set by the instructor, he may be withdrawn from the course.

If a student decides to no longer participate in the course, for any reason, it is the student's responsibility to officially withdraw from the course. To officially withdraw from the course, students must complete and sign a withdrawal form, available in the Registrar's Office. Failure to do so will result in the student remaining enrolled and receiving a grade – most likely an 'F'.

D. ACADEMIC HONESTY

Brazosport College assumes that students eligible to perform on the college level are familiar with the ordinary rules governing proper conduct including academic honesty. The principle of academic honesty is that all work presented by you is yours alone. Academic dishonesty including, but not limited to, cheating, plagiarism, and collusion shall be treated appropriately. Please refer to the Brazosport College Student Guide for more information. This is available online at <http://www.brazosport.edu>.

Academic dishonesty violates both the policies of this course and the Student Code of Conduct. In this class, any occurrence of academic dishonesty will be referred to the Dean of Student Services for prompt adjudication, and may, at a minimum, result in anything from zero for the assignment to an F in this course. Sanctions may be imposed beyond your grade in this course by the Dean of Student Services.

E. CELL PHONES

As a courtesy to the class, all pagers and cellular telephones should be turned **OFF** and out of sight during lecture.