HUMAN ANATOMY AND PHYSIOLOGY I

SCB203

LaGuardia Community College
Dept. of Natural Science
Dr. Carol Haspel, Coordinator

Revised 3/2011
Policy on Cheating

Instructors of this course are required to implement College policy regarding cheating on examination and quizzes. A complete statement is available through student counseling services.

A synopsis is as follows:

If an instructor suspects a student of cheating, of any of the violations listed below, the instructor will inform the student of his or her suspicion, and a student/teacher conference will be held. At that conference, the suspected violation and the instructor’s intended penalty for the violation will be discussed.

1. Give the student a copy of the STUDENT HANDOUT ON LAGUARDIA ACADEMIC INTEGRITY POLICY (this document) and answer any questions the student may have.

2. Inform the student of the reasons for your suspicions and the intended penalties. These penalties may include, but are not limited to, the following:
   a. An “F” on the paper, quiz, assignment or examination involved:
   b. An “F” for the course.

3. If the student admits guilt, and agrees on the penalty, he/she should indicate so on the formal complaint. The instructor will then send the complaint to the Office of Academic Standing and impose the penalty.

4. If the student does not admit guilt or agree to the penalty, the student/teacher conference will end, and a hearing on the issue must be held. The instructor will then submit the complaint to the Office of Academic Standing, which will send a copy to the Dean of Students, who will then begin disciplinary proceedings.

If the records of the Office of Academic Standing indicate that the student has committed a similar offense, the Office of Academic Standing will:

Send a copy of the complaint to the Dean of Students, who will begin disciplinary proceedings.
The final grade for Human Biology is calculated from both lecture and laboratory examination grades; 60% of the final grade is determined from the lecture exams and 40% from the lab exams.

### Lecture Exams

<table>
<thead>
<tr>
<th>% of the Final Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>30%</td>
<td>6 Lecture Quizzes (of which the lowest grade may be dropped at the instructor’s discretion)</td>
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<tr>
<td>15%</td>
<td>1 Midterm Exam</td>
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<td>15%</td>
<td>1 Final Exam</td>
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Total: 60%

### Laboratory Exams

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<tr>
<th>% of the Final Grade</th>
<th>Description</th>
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<tr>
<td>20%</td>
<td>2 Practical Exams</td>
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<tr>
<td>10%</td>
<td>1 Written Exam</td>
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<tr>
<td>10%</td>
<td>1 Written Exam with practical component</td>
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Total: 40%

Practical exams will be based on identification of actual laboratory materials displayed at stations. Written exams will include short answers, fill-ins, diagrams, and short essays. Attendance is compulsory for all labs. It will be the student’s responsibility to make-up any missed labs. No make-up exams are given in laboratory.

### Final Grades

- 92.5-100 = A
- 89.5-92.4 = A-
- 86.5-89.4 = B+
- 82.5-86.4 = B
- 79.5-82.4 = B-
- 76.5-79.4 = C+
- 72.5-76.4 = C
- 69.5-72.4 = C-
- 66.5-69.4 = D+
- 62.5-66.4 = D
- 59.5-62.4 = D-
- 0-59.4 = F
Attendance and punctuality are necessary for success; absence or lateness exceeding 10% is considered excessive. Classes will meet in accordance to the Academic Calendar (be sure to get a copy from the Information Desk in the Main Building) unless otherwise specified. Severe weather does not cancel classes; listen to your radio/TV for College closings.

Student rights and responsibilities can be found in the College Handbook and Catalog, please refer to them.

The Grading Policy for these courses can be found on page 3 of your course outline. Repeat, “R”, grades are not given in this course and Incompletes, “IN”, are issued only under very restricted circumstances. In order to receive an Incomplete, a student must have PASSING GRADES and be able to document why he/she is unable to complete the course work during the semester. Both the student and the instructor must complete and sign an Incomplete Form and list the exams that must be satisfactorily completed before a grade is issued. Students have 6 months to take the missing exams; otherwise the Incomplete is automatically converted to an F. An Incomplete does not provide a student with an opportunity to retake an exam(s); all prior grades are retained and added into the calculation of the final grade.
<table>
<thead>
<tr>
<th>LECTURE</th>
<th>TOPIC (S)</th>
<th>READING</th>
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<tbody>
<tr>
<td>1.</td>
<td>Outline of Human Biology</td>
<td>Ch. 1 (pg. 2-3, 12-19, 37-39)</td>
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<tr>
<td>2.</td>
<td>Introduction to Chemistry</td>
<td>Ch. 2</td>
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<tr>
<td>3.</td>
<td>Reactions and Ionic Bonding</td>
<td>Appendix A (pg. A1)</td>
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<td>4.</td>
<td>Covalent and Hydrogen Bonding</td>
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<td>5.</td>
<td>Acids, Bases, and Salts</td>
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<tr>
<td>6.</td>
<td>LECT. QUIZ 1 Introduction to Biochemistry</td>
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<tr>
<td>7.</td>
<td>Lipids and Proteins</td>
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<td>8.</td>
<td>Nucleic acids &amp; Heredity</td>
<td>pg. 115-120, 129-131</td>
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<td>9.</td>
<td>Protein Synthesis</td>
<td>pg. 121-126</td>
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<td>10.</td>
<td>The Cell</td>
<td>Ch. 3</td>
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<tr>
<td>11.</td>
<td>Cell Physiology</td>
<td>pg. 126-129</td>
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<td>12.</td>
<td>LECT. QUIZ 2 Tissue – Epithelial</td>
<td>Ch. 5</td>
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<td>13.</td>
<td>Tissue-Connective, and organs</td>
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<td>14.</td>
<td>Integumentary System-Introduction</td>
<td>Ch. 6</td>
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<td>15.</td>
<td>Skin Derivatives and Pathology</td>
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<td>16.</td>
<td>LECT. QUIZ 3 Skeletal Organization</td>
<td>Ch. 7</td>
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<td>17.</td>
<td>Skeletal Physiology &amp; Joints</td>
<td>Ch. 9</td>
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<tr>
<td>18.</td>
<td>MIDTERM EXAM (will test Chap 1-3, 5-7, 9 + additional pages)</td>
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<tr>
<td>19.</td>
<td>Muscular Organization</td>
<td>Ch. 11 + Pg. 164-165, 313-317</td>
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<tr>
<td>20.</td>
<td>Myophysiology and neural control</td>
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<td>22.</td>
<td>Myopathology</td>
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<td>23.</td>
<td>LECT. QUIZ 4 Blood-components and Functions</td>
<td>Ch. 18</td>
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<td>24.</td>
<td>Blood Types and Clotting</td>
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<td>25.</td>
<td>Blood Pathology</td>
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<td>26.</td>
<td>Cardiology</td>
<td>Ch. 19</td>
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<td>27.</td>
<td>Control of Cardiac Function &amp; Cardiopathy</td>
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<td>28.</td>
<td>LECT. QUIZ 5 Circulation</td>
<td>Ch. 20 (pg. 750-773, 800-802)</td>
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<td>29.</td>
<td>Circulatary Physiology</td>
<td>pg. 790-791 + 1115</td>
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<tr>
<td>30.</td>
<td>Structure and Mechanics of Respiration</td>
<td>Ch. 22 + Pg. 593-94</td>
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<tr>
<td>31.</td>
<td>Physiology and Chemistry of Respiration</td>
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<td>32.</td>
<td>Regulation of Respiration and Disorders</td>
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<td>33.</td>
<td>LECT. QUIZ 6 Lymphatics</td>
<td>Ch. 21</td>
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<td>34.</td>
<td>Immunity</td>
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<td>35.</td>
<td>Immunity continued</td>
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<tr>
<td>36.</td>
<td>Review</td>
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**FINAL EXAMINATION GIVEN DURING EXAM WEEK**
(Chapter 11, 18-22 will be tested plus additional designated pages)

SCB 203 – HUMAN ANATOMY AND PHYSIOLOGY I
LECTURE OUTLINE

Lecture 1: Outline of Human Biology

A general discussion of the principles of human physiology.

Objectives:
- a. Define physiology, cytology, anatomy, histology and pathology.
- b. Determine the relationship between structure and function.
- c. Compare the levels of structural organization within the human body and define a cell, tissue, organ, organ system and organism.
- d. List the characteristics of living things.
- e. Explain why homeostasis is a state, which results in normal body activities and why the inability to achieve homeostasis is a condition, which leads to malfunction, and related disorders. Give examples of negative feedback and positive feedback mechanisms.

Lecture 2: Introduction to Chemistry

The physical basis of Chemistry including a definition of energy, matter and atomic structure.

Objectives:
- a. Define energy and matter.
- b. Explain, by diagram, the Bohr model of the atom using the elements most commonly found in the human body. Define proton, electron and neutron.
- c. Explain atomic number, atomic mass, isotope and the organization of the periodic table.
- d. Describe the distribution of electrons into energy levels and the octet rule.

Lecture 3: Chemical reactions and ionic bonding

A discussion of chemical reactions and ionic bonding.

Objectives:
- a. Define a chemical reaction as a function of electrons in incomplete energy levels.
- b. Describe chemical and structural formulas, valence electrons and chemical equations.
- c. Discuss ionic bond formation in a molecule such as NaCl.
- d. Explain anion, cation, ionic compounds, dissociation and electrolyte.
- e. Define a chemical bond as a force of attraction among atoms in compounds or molecules.

Lecture 4: Covalent and Hydrogen Bonding and Chemical Reactions

A discussion of covalent and hydrogen bonding and types of chemical reactions.

Objectives:
- a. Describe covalent bond formation as the sharing of outer energy level electrons, give examples.
- b. Define hydrogen bonding and its functions.
- c. Explain compounds, molecules and radicals (give examples of biologically important ones).
- d. Identify and compare each of the 4 types of chemical reactions.
- e. Define the type of energy involved when chemical bonds are created or broken.
**Lecture 5: Acids, Bases and Salts**
A discussion of the most common inorganic acids, bases and salts, and a definition of the acid-base reaction.

**Objectives:**

a. List and compare the properties of acids, bases and salts.
b. Define pH as a degree of alkalinity or acidity of a solution.
c. Describe the role of a buffer system as a homeostatic method for maintaining the pH of a body fluid.

**Lecture 6: Introduction to Organic Chemistry and Biochemistry**

A discussion of covalently bonded carbon compounds, and how they form the foundation for organic chemistry and biochemistry.

**Objectives:** QUIZ 1 and

a. Define and distinguish between inorganic and organic compounds.
b. Mention water and salts as inorganic compounds essential to life.
c. Describe the chemical characteristics of hydrocarbons and their functional side groups.
d. Discuss the structure and importance of carbohydrates. Compare and contrast mono, di- and polysaccharides.
e. Define: polymer and isomer (use the isomers of the hexose as examples).
f. Differentiate between dehydration synthesis and hydrolysis of organic molecules.

**Lecture 7: Lipids and Proteins**

A discussion of lipid and protein chemistry and their importance in humans.

**Objectives:**

a. Contrast the chemical structures and functions of neutral fats, phospholipids and steroids.
b. Differentiate between saturated and unsaturated fatty acids.
c. Emphasize the importance of lipids as structural, functional and energy storage molecules.
d. Describe the chemistry of proteins.
e. Emphasize that proteins have three-dimensional shapes, which are highly specific and allow them to function as structural and functional molecules.
f. Define and describe the role of enzymes as organic catalysts.

**Lecture 8: Nucleic Acids and Heredity**

A discussion of the structure of DNA and RNA, the genetic code, and the chemical basis of heredity.

**Objectives:**

a. Define and describe DNA and RNA as polymers of nucleotides.
b. Compare and contrast the structure of DNA and RNA.
c. Define the role of DNA in heredity and protein synthesis.
d. Discuss the mechanism of DNA replication and its importance.
e. Define a gene.
f. Describe ATP as an energy storage nucleotide.
Lecture 9: Protein Synthesis

A discussion of the mechanism by which DNA and RNA control protein synthesis.

Objectives:

a. Describe the sequence of events involved in protein synthesis.
b. Describe the functions of RNA in protein synthesis. Be sure to include mRNA and tRNA.

Lecture 10: Metabolism and Cell structure

The definition and description of the unit of life, the cell.

Objectives:

a. Define and list a generalized cell’s parts.
b. Describe the molecular organization of the cell membrane.
c. List the factors related to the semi permeability of the cell membrane discussing channels and pumps.
d. Define diffusion, osmosis, filtration, active transport, vesicular transport (endo and exocytosis).
e. Explain how unequal charge distribution results in transmembrane potential.

Lecture 11: Cell physiology

A continuation of the discussion of cell structure and function.

Objectives:

a. Describe the structure and function of the nucleus.
b. Describe the functions of cytoplasm.
c. Describe the structure and functions of the smooth and rough endoplasmic reticulum.
d. Define the function of the ribosomes.
e. Describe the structure and functions of the Golgi apparatus.
f. Describe the function of mitochondria as “powerhouses of the cell”.
g. Explain why a lysosome in a cell is called a “suicide packet”.
h. Describe the structure and the function of centrioles in cellular reproduction.
i. Describe the structure of the cytoskeleton and its functions.

Lecture 12: Tissue and Organs

A description of how cells are organized into tissues and tissues into organs. A brief discussion of the various structures and functions of epithelial tissue.

Objectives: QUIZ 2 and

a. Review the definitions of tissue and organ.
b. Classify the tissues of the body into four major types.
c. Compare the distinguishing characteristics of epithelial tissue.
d. Compare the cell shape and the layering arrangements of epithelium.
e. Describe Cell Adhesion Molecules and basal lamina as intercellular connectives.
f. Define a gland.
g. Distinguish between exocrine and endocrine glands.
Lecture 13: Connective Tissue and Membranes

A description of the organization of connective tissue and the different properties which give rise to the variety of connective tissue in the body. An introduction to membranes.

Objectives:

a. Describe the distinguishing characteristics of connective tissue.
b. Describe the ground substance, fibers, matrix and cells that comprise connective tissue.
c. Contrast the different kinds and functions of connective tissues.
d. Define a membrane as an organ.
e. List the location, composition and the function of mucous, serous, synovial, and cutaneous membranes.

Lecture 14: Integumentary System - Introduction

An introduction to the structure and functions of the integumentary system.

Objectives:

a. List the functions of the integumentary system.
b. Define the skin as an organ and a component of the integumentary system.
c. Explain how the skin is structurally divided into an epidermis, dermis, and subcutaneous portion.
d. List the structural layers of the epidermis and describe their function.
e. Discuss keratinization of the epidermis.
f. Discuss skin color, freckles and tanning.
g. Explain the composition and functions of the dermis.
h. Contrast the structure and function of the papillary and reticular layers of the dermis.
i. Describe the structure and functions of the subcutaneous (hypodermis) layer.
j. Classify burns into the first, second, and third degree type.

Lecture 15: Skin Derivatives and Pathology

A description of the organs, which develop from the embryonic epidermis and how the integumentary system carries out some of its functions.

Objectives:

a. Compare and contrast the structure and function of such epidermal derivatives as hair, glands (sebaceous, sudoriferous and ceruminous) and nails.
b. Describe the role of skin in the maintenance of normal body temperature.
c. Explain how the skin functions as an excretory organ and how it repairs itself.
d. Discuss the role of the skin in protecting against disease and desiccation.
e. Explain the effects of aging on the skin and cancer.

Lecture 16: Skeletal Organization

A discussion of the organization and histology of the skeletal system.

Objectives: QUIZ 3 and

a. Describe the organs of the skeletal system.
b. Describe the functions of the skeletal system.
c. Describe the gross features of a long bone.
d. Describe the histological features of compact bone.
e. Compare and contrast the histological features of cancellous and compact bone.
f. Define ossification.
Contrast intramembranous and endochondral ossification.

Describe the conditions necessary for normal bone growth.

**Lecture 17: Skeletal Physiology, Joints, Pathology and Arthrology**

A continuation of the discussion of normal bone function and an introduction to selected pathologies. A discussion of joint structure and function.

**Objectives:**

a. Compare and contrast tendons and ligaments structurally and functionally; define bursa.
b. Discuss diseases of the skeletal system.
c. Define a fracture and briefly describe how bones repair themselves.
d. Define articulation.
e. Compare and contrast the structure, kind of movement, and location of fibrous, cartilaginous, and synovial joints.
f. Describe the detailed structure of a synovial joint.
g. Describe and compare the movements possible at various kinds of synovial joints.
h. Describe the causes and symptoms of common joint disorders, including arthritis, bursitis, tendonitis, and intervertebral disc abnormality.

**Lecture 18: MIDTERM (lectures 1-17)**

**Lecture 19: Muscular Organization**

An introduction to the muscular system including Histology and Ultrastructure.

**Objectives:**

a. List the distinguishing properties of muscular tissue.
b. Compare the location, microscopic appearance, nervous control, and functions of the three kinds of muscle tissue.
c. Identify the histological characteristics of skeletal muscle.
d. Define epimysium, perimysium, endomysium and fascia. Tell how these bind muscle fibers into muscle organs and connect muscle to bone.
e. Describe the ultrastructure of skeletal muscle tissue including the myofibril and sarcomere.

**Lecture 20: Muscle Physiology**

A discussion of the physical principles of muscle function and the physiology of the contraction of the muscle fiber.

**Objectives:**

a. Describe the source of energy for muscular contraction.
b. Describe the physiological importance of the motor unit.
c. Describe the physiology of contraction by listing the events associated with the sliding-filament theory.
d. Define the all-or-none principle of muscular contraction.
e. Describe the principle of oxygen debt.
f. Describe the structure and physiology of the myoneural junction.

**Lecture 21: Muscles and Body Movements**

A discussion of how muscle brings about body movement.

**Objectives:**
a. Describe the relationship between bones and skeletal muscles in producing body movements.
b. Define a lever and fulcrum, and compare the classes of levers on the basis of placement of the fulcrum, effort and resistance.
c. Describe most body movements as activities of groups of muscles by explaining the roles of the prime mover, antagonist, and synergist.
d. Describe the process of myography. Define twitch, tetanus, fatigue and rigor mortis.
e. Define recruitment, isotonic, and isometric contractions, atrophy and tone.
f. Relate muscle insertion sites to the range of motion of the joint and muscle force.
g. Discuss hypertrophy and atrophy and proprioceptors.

Lecture 22: Myopathology

A discussion of selected muscle pathologies.

Objectives:
a. Define such common muscular disorders as fatigue, fibrosis, myasthenia gravis, muscular dystrophy and TMJ syndrome.
b. Compare spasms, cramps, convulsions, and fibrillation as abnormal muscular contractions.

Lecture 23: Blood-Components and functions

A discussion of the structures and functions of the formed elements and the plasma.

Objectives: QUIZ 4 and
a. Contrast the general roles of blood, lymph, and interstitial fluid in maintaining homeostasis.
b. Define the principle physical characteristics of blood (pH, viscosity, temperature, volume).
c. Identify plasma and describe its composition.
d. Describe the formed elements and compare their origins.
e. Describe the structure of erythrocytes and their function in carrying of oxygen and carbon dioxide.
f. Define erythropoiesis and identify the factors related to erythrocyte production and destruction.
g. List the types and functions of leucocytes.
h. Describe the importance of a differential white count.
i. Discuss the role of leucocytes in phagocytosis and antibody production.
j. Discuss the structure of thrombocytes (platelets) and define their role in blood clotting.

Lecture 24: Blood Types and Clotting

A discussion of coagulation and agglutination.

Objectives:
a. Describe the stages involved in blood clotting (emphasize the common pathway).
b. Identify the factors that promote and inhibit blood clotting.
c. Contrast a thrombus and an embolus.
d. Define clotting and bleeding times.
e. Define the ABO and Rh blood grouping classifications.
f. Define the agglutination reaction as the basis for ABO blood symptoms.

Lecture 25: Blood Pathology

A discussion of some common blood disorders and their clinical symptoms.
Objectives:
a. Define erythroblastosis fetalis as a harmful antigen-antibody reaction.
b. Compare the clinical symptoms of polycythemia and leukemia.
c. Contrast the causes of hemorrhagic, hemolytic, aplastic, iron deficiency, pernicious and sickle cell anemia.
d. Identify the clinical symptoms of infectious mononucleosis.

Lecture 26: Cardiology

A discussion of cardiac structure and function.

Objectives:
a. Contrast the structure of the epicardium, myocardium, and endocardium.
b. Identify the blood vessels of the heart, the chambers of the heart, and the valves of the heart.
c. Describe the coronary vessels and coronary blood flow.
d. Define systole and diastole as the two principal events of the cardiac cycle.
e. Describe the pressure changes associated with blood flow through the heart.
f. Describe the events of the cardiac cycle as a function of time.
g. Describe the sounds of the heart and their clinical significance.
h. Describe the initiation and conduction of the nerve impulse through the nodal system of the heart.

Lecture 27: Control of Cardiac Function and Cardiopathology

A discussion of the mechanisms, which control heartbeat and heart rate and cardiac malfunction.

Objectives:
a. Label and explain the deflection waves of a normal electrocardiogram.
b. Define cardiac output and identify those factors that determine it.
c. Define Starling’s “Law of the heart”.
d. Contrast the effects of sympathetic and parasympathetic stimulation of the heart.
e. Define the role of baroreceptors and chemoreceptors in the control of the rate of heartbeats.
f. Define the role of the medulla in the control of heart rate.
g. Describe the effects of body temperature, ion concentration, sex, age, hormones, and physical conditioning on heart rate.
h. Contrast bypass surgery and transluminal coronary angioplasty.
i. Discuss: congenital heart defects, valve disorders, ischemic heart disease and disturbances of heart rhythm.
j. Compare angina pectoris and myocardial infarction as abnormalities of coronary circulation.

Lecture 28: Circulation

A discussion of the structure of the blood vessels and the different circulatory routes.

Objectives: QUIZ 5 and
a. Contrast the structures and functions of veins, capillaries, and arteries.
c. Describe the importance and route of blood involved in portal circulation.
d. Identify the major blood vessels of pulmonary circulation.
e. Contrast fetal and adult circulation.
f. Explain the fate of fetal circulation structures once postnatal circulation is established.
g. Define patent ductus arteriosus and patent foramen ovale and describe their consequences.
Lecture 29: Circulatory Physiology

A discussion of the physiology of blood and vessel disease.

Objectives:

a. Describe why blood flows through vessels.
b. List the factors that resist the flow of blood through vessels.
c. List the factors that assist the return of venous blood to the heart.
d. Define pulse and identify those arteries where pulse may be felt.
e. Discuss blood velocity and exchange of materials in the capillaries.
f. Define blood pressure and discuss blood pressure regulation—be sure to include hormonal factors.
g. Describe one clinical method for recording systolic and diastolic pressure.
h. Contrast the clinical significance of systolic, diastolic, and pulse pressures.
i. List the causes and symptom of aneurysms, arteriosclerosis, and hypertension.

Lecture 30: Structure and Mechanisms of the Respiratory System

Objectives:

a. Identify the organs of the respiratory system.
b. Describe the olfactory receptors of the nasal cavity.
c. Differentiate between the three regions of the pharynx and describe their roles in respiration.
d. Identify the anatomical features of the larynx related to respiration and voice production.
e. Describe the tubes that form the bronchial tree with regard to structure and location.
f. Identify the coverings of the lungs and the gross anatomical features of the lungs.
g. Describe the role of the respiratory membrane in the diffusion of respiratory gases.

Lecture 31: Physiology and Chemistry of Respiration

A description of the mechanisms of respiration.

Objectives:

a. List the sequence of pressure changes involved in respiration and expiration.
b. Compare the volumes and capacities of air exchanged in respiration.
c. Define the partial pressures of gases, surfactant and compliance.
d. Describe the mechanisms of external and internal respiration based on differences in partial pressure of O₂ and CO₂.
e. Describe how O₂ and CO₂ are carried by the blood and how these mechanisms are affected by temperature and pH.

Lecture 32: Regulation of Respiration and Respiratory Disorders

Review of regulatory mechanisms of respiration and respiratory pathology.

Objectives:

a. Describe the parts of the nervous system that control respiration.
b. Compare and contrast the roles of the Hering-Breuer reflex and the pneumotaxic center in controlling respiration.
c. Describe the effects of chemical stimuli and blood pressure in determining the rate of respiration.
d. Define hay fever, bronchial asthma, choking, pneumonia, tuberculosis and COPD.
**Lectures 33**: Lymphatics

A discussion of the lymphatic system with an emphasis on contrasting its structures and functions with those of the cardiovascular system.

**Objectives:** QUIZ 6 and
a. Identify the structures and functions of the lymphatic system.
b. Compare the location, composition and function of interstitial fluid and lymph.
c. List the forces responsible for the circulation of the lymph.
d. Discuss the spleen and thymus as lymph organs.
e. Identify the clinically important groups of lymph nodes and nodules.
f. Describe the structure and function of lymph nodes.
g. Compare and contrast the lymphatic vessels with those of the cardiovascular system.

**Lecture 34**: Immunity

A description of the specific and nonspecific defense mechanisms of the body.

**Objectives:**
a. Identify the kinds of specific and nonspecific defenses against infection.
b. Relate the physiological changes and clinical symptoms associated with inflammation.
c. Describe the process of phagocytosis.
d. Contrast T and B-lymphocytes with respect to life cycle and function. Identify other cells that function in immune responses, such as macrophages and other antigen-presenting cells (APCs).
e. Define immunity and discuss and how the body recognizes self from foreign matter.
f. Discuss antibody-mediated immunity and define and describe the terms antigen and antibody.
g. Describe the function of the antibody in an antigen-antibody reaction (e.g. complement fixation).
h. Explain antibody diversity according to current theory.

**Lecture 35**: Immunity Continued

A review of cell-mediated immunity.

**Objectives:**
a. Describe the mechanisms of cell-mediated immunity, including development of memory cells.
b. Define the roles of Helper T-cells and its significance with regard to AIDS.
c. Contrast active and passive immunity, giving examples of each.
d. Describe why and how vaccination works.
e. Describe the immunological basis of autoimmune diseases, give two examples and list possible causes.
f. Explain a) hay fever response and b) systemic anaphylaxis.

**Lecture 36**: Review

Review the lecture material in preparation for the final

**Objectives:**
a. Review