ANATOMY AND PHYSIOLOGY
One and Two

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CURRICULUM: ANATOMY AND PHYSIOLOGY

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Anatomy and Physiology

Course Description

Anatomy and Physiology is the study of the structure and function of the human body. This course follows a sequential development of the major body systems in an organized and structured curriculum. The course is designed to give the students a selective overview of human anatomical structure and an analysis of human physiological principles. Labs will include slide work, dissection of various animals and studies of the human skeleton. The course will also use computer simulated dissection.

Credits

Anatomy and Physiology 1
Units 1- 11
IDST-1221 - 4 credits

Anatomy and Physiology 2
Units 12- 21
IDST-1222 - 4 credits
Teaching Suggestions

1. Teacher lecture, followed by discussion.
2. Students read text, followed by discussion.
3. Students view audio-visual material, followed by discussion.
4. Students complete computer software program assignments, when available.
   a. Body Illustrated, IBM
   b. Body Works, IBM
   c. The Mayo Clinic, C.D. Rom IBM or MAC
   d. Adam, IBM
   e. Optical Data Laser Disc - Life Sciences / Human Body
   f. Dean Vaughn - Human Anatomy Series
   g. Dr. Know-It-All, Body Works, MAC
   h. VH Dissector Pro
5. Students read articles, pamphlets and case assignments followed by class discussion.
6. Students view and make posters, followed by class discussion.
7. Guest speakers when appropriate.
8. Related field trips when appropriate.
9. Individual discussion.
10. Written and photocopied notes.
11. Written and oral testing.
Methods of Student Evaluation

Student evaluation will be based on but not limited to the following factors:

1. Student proficiencies
2. Attendance
3. Class Preparation
4. Class Participation
5. Completion of assignments including class work, homework, tests and lab assignments.
6. Fulfillment of other responsibilities as stated by individual instructors. i.e. Student contract, dated and signed.

Grade Determination

The minimum level of satisfactory performance in this course is a ‘C’ or better. To receive a ‘C’ or better, students must first complete ALL course requirements specified above, including meeting the minimum attendance expectation.

Upon successful completion of the course students will be eligible to take the Health Science Careers standardized exam to determine college credit.

For Anatomy and Physiology 1 and 2, 50% of standardized exam grade + 50% high school grade = UMDNJ grade as listed on UMDNJ-SHRP transcript.

All students must attain a C (75) or better to earn college credits. Minimum passing standardized exam grade must be at least 65 before calculations of college transcript grade can be determined.

Health Science Careers Program Grading System

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numerical Equivalent</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100</td>
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<tr>
<td>B+</td>
<td>87-91</td>
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<tr>
<td>B</td>
<td>83-86</td>
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<tr>
<td>C+</td>
<td>79-82</td>
</tr>
<tr>
<td>C</td>
<td>75-78</td>
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**Unsatisfactory Performance/Progress**

Unsatisfactory performance which may include late assignments, failing grades, and/or attendance or progress problems will be discussed individually on an as needed basis.

**Honor Code and Academic Integrity**

(Refer to your SHRP Student Handbook at [http://shrp.umdnj.edu/current_students/handbook.pdf](http://shrp.umdnj.edu/current_students/handbook.pdf))

The faculty of UMDNJ-School of Health Related Professions believe that students must observe and support high standards of honesty and integrity. For this reason, all students in this course are expected to abide by the School's Honor Code and uphold its Code of Academic Integrity. As described in detail in your Student Handbook, violations of the Code of Academic Integrity include cheating, plagiarism, fabrication and/or academic misconduct. All such violations will be considered with gravest concern and may be punishable with sanctions as severe as suspension or dismissal. If you have not previously affirmed the School's Honor Code (either in writing or electronically), you must submit a signed and dated copy of the Honor Code to the instructor by the end of the first week of the semester. The Honor Code form is provided in the current SHRP Student Handbook.

**General Learning Resources**

**Textbooks References**

**Hole's Human Anatomy and Physiology**
David Shier
Jackie Butler
Ricki Lewis
Wm. C. Brown/McGraw Hill Publishers

**Essentials of Human Anatomy and Physiology**
Hole, J.W.
Wm. C.Brown Publishers

**Principals of Anatomy and Physiology**
Tortora, G.J. and Grabowski, S.R.
HarperCollins College Publishers, Inc.

**Human Anatomy and Physiology**
Marieb, E.N.
The Benjamin/Cummings Publishing Company, Inc.

**Fundamentals of Anatomy and Physiology**
Martini, F.
Prentice Hall
Anatomy and Physiology  
The Unity of Form and Function  
Kenneth S. Saladin  
Wm. C. Brown/McGraw Hill Publishers  

Essentials of Anatomy and Physiology  
Valerie C. Scanlon  
Tina Sanders  
F.A. Davis  

Biochemistry Illustrated Reviews  
Pamela C. Champe  
Richard A. Harvey  
J.B. Lippincott Company  

Laboratory Manual for Human Anatomy with Cadavers  
Victor P. Eroschenko  
Harper & Row, Publishers
Course Description:

Anatomy and Physiology is the study of structure and function of the human body. This course follows a sequential development of the major body systems in an organized structured curriculum. The course is designed to give the student a selective overview of human anatomical structure and a brief analysis of human physiological principles. Labs will include slide work, dissection and studies of the human skeleton.

Course Competencies

Upon completion of this course the student will be able to:

1. Utilize the language of anatomy to describe levels of structural organization and examples of homeostasis

2. Apply basic concepts of chemistry and biochemistry.

3. Identify microscopic structures as presented in the lab.

4. Identify and explain the structure and function of the major body systems and explain their interrelationships with one another in maintaining homeostasis.

5. Identify and locate gross structures of the human anatomy.

6. Develop dissection and lab skills with awareness of infection control and safety.

7. Compare and contrast normal and abnormal characteristics and functions of the body.
Requirements for Anatomy and Physiology

The study of the structure and function of the human body is necessary as a basic science prerequisite. This will prepare the student for all other basic science and clinical courses. This introductory course includes lectures and lab components of Anatomy and Physiology. It will also include basic chemistry and microbiology.

OUTLINE:
1. Introduction to Anatomy and Physiology
2. Characteristics of Life
3. Levels of Organization
4. Chemistry
5. Biochemistry
6. Cells
7. Integumentary System
8. Skeletal System
9. Muscular System
10. Nervous System
11. Special Senses
12. Endocrine System
13. Lymphatic System
14. Blood
15. Cardiovascular System
16. Respiratory System
17. Digestive System
18. Urinary System
19. Water and Electrolyte Balance
20. Female Reproductive System
21. Male Reproductive System
Anatomy and Physiology 1

Course Outline

I. Anatomy and Physiology
   A. Study of Structure
   B. Study of Function

II. Characteristics of Life
   A. Maintenance of Life
   B. Homeostasis

III. Levels of Organization
   A. Body Cavities
   B. Planes
   C. Directions
   D. Body Regions
   E. Organ Systems
   F. Important terms related to Levels of Organization

IV. Chemistry
   A. Concepts and Composition of Matter
   B. Anatomic Structure
   C. Molecules and Compounds
   D. Chemical Bonds and Chemical Reactions
   E. Important terms related to Chemistry

V. Biochemistry
   A. Inorganic Compounds
   B. Organic Compounds
   C. Acid/Base Balance

VI. Cells
   A. Composition of the Cell
   B. Membrane Transport (hypertonic/hypotonic)
   C. Cell Division
   D. Body Tissues
   E. Abnormal Cell Division
   F. Tissue Repair
VII. Integumentary System
A. Skin and Tissues
B. Accessory Organs of the Skin
C. Homeostatic Balance of the Skin
D. Common Diseases and Skin Disorders
E. Clinical Applications
F. Related Hormonal Involvement
G. Medical Terminology

VIII. Skeletal System
A. Physiology: Functions of Bone
B. Anatomy: Structure of Bone
C. Characteristics of Bone
D. Bone Growth and Development
E. Intramembranous and Endochondral Ossification
F. Clinical Applications
G. Hormonal Involvement
H. Common Diseases and Disorders
I. Medical Terminology

IX. Muscular System
A. Characteristics of Muscle Tissue Types
   B. Physiology of Muscle Tissue
   C. Anatomy and Innervation of Skeletal Muscle Tissue
   D. Hormonal Involvement
   E. Clinical Applications
   F. Anabolic Steroids
   G. Common Diseases and Disorders
   H. Medical Terminology

X. Nervous System
A. Divisions of the Nervous System
   1. Central Nervous System
   2. Peripheral Nervous System
B. Functional Classification
   1. Sensory
   2. Motor
      a) Somatic
      b) Autonomic
C. Neurophysiology
D. Anatomy of the Brain
E. Cranial and Spinal Nerves
F. Disorders: Homeostatic Imbalances
G. Regeneration of Nervous Tissue
H. Clinical Applications
I. Medical Terminology
XI. Special Senses
   A. Eye and Vision
   B. Ear, Hearing and Equilibrium
   C. Somatic Senses
   D. Disorders: Homeostatic Imbalances
   E. Clinical Applications
   F. Medical Terminology

Anatomy and Physiology 2

XII. Endocrine System
   A. Functions of Endocrine Glands and Hormones
   B. Mechanisms of Hormone Actions
   C. Control of Hormone Secretions
   D. Growth Factors
   E. Stress and Its Effects
   F. Clinical Applications
   G. Medical Terminology

XIII. Digestive System
   A. Digestive Processes
   B. Anatomy of Digestive Tract
   C. Physiology of Chemical Digestion
   D. Regulation of Digestive Secretions
   E. Physiology of Absorption
   F. Basal Metabolism
   G. Disorders: Homeostatic Imbalances
   H. Clinical Applications
   H. Medical Terminology

XIV. Respiratory System
   A. Organs of the Respiratory System
   B. Physiology of Respiration
   C. Transport and Gas Exchange
   D. Nervous Control of Respiration
   E. Disorders: Homeostatic Imbalances
   F. Clinical Applications
   G. Medical Terminology
XV. Blood
   A. Functions of Blood
   B. Blood Composition and Blood Cells
   C. Blood Plasma
   D. Formation of Blood Cells
   E. Anatomy and Physiology of Red and White Blood Cells and Platelet
   F. Blood Groups
   G. Disorders: Homeostatic Imbalances
   H. Clinical Applications
   I. Medical Terminology

XVI. Cardiovascular System
   A. Structure of the Heart
   B. Actions of the Heart
   C. Blood Vessels
   D. Blood Pressure
   E. Path of Circulation
   F. Arterial and Venous Systems
   G. Hormonal Involvement
   H. Disorders: Homeostatic Imbalances
   I. Clinical Applications
   J. Medical Terminology

XVII. Lymphatic System
   A. Lymphatic Vessels and Lymph Circulation
   B. Lymph Tissues
   C. Nonspecific Resistance to Disease
   D. Immunity and Allergic Reactions
   E. Disorders: Homeostatic Imbalances
   F. Medical Terminology

XVIII. Urinary System
   A. Kidneys and Related Structures/Organs
   B. Physiology of Urine Formation and Elimination
   C. Kidney Function
   D. Disorders: Homeostatic Imbalances
   E. Medical Terminology

XIX. Water, Electrolyte and Acid/Base Balance
   A. Distribution of Body Fluids
   B. Water Balance
   C. Electrolyte Balance
   D. Acid/Base Balance
   E. Clinical Applications
XX. Female Reproductive System
A. Organs of the Female Reproductive System
B. Parturition
C. Hormonal Control of Female Reproductive Factors
D. Conception/Birth Control
E. Disorders: Homeostatic Imbalances
F. Clinical Applications
G. Medical Terminology

XXI. Male Reproductive System
A. Organs of the Male Reproductive System
B. Hormonal Control of the Male Reproductive System
C. Disorders: Homeostatic Imbalances
D. Clinical Applications
E. Medical Terminology
Objectives:

I. Introduction to Anatomy and Physiology
   A. Define the terms anatomy and physiology, and give three examples for each.

II. Characteristics of Life
    A. List the major characteristics of life and give examples of each.
    B. List and describe the survival needs of a human organism.
    C. Define homeostasis and discuss its importance.
    D. Give examples of negative and positive feedback.

III. Levels of Organization
     A. List and describe in order of increasing complexity the levels of organization of the human body.
     B. Demonstrate the term Anatomical position.
     C. List the major body cavities and their subdivisions.
     D. List and describe the main directional terms and planes used in describing the body.
     E. Use appropriate terms to describe relative positions, body sections, and body regions.
     F. List the eleven major organ systems of the body.
     G. Briefly describe the functions of the major organ systems.

IV. Chemistry
    A. Explain the importance of chemistry in the study of anatomy and physiology.
    B. Distinguish between matter and energy and classify each.
    C. Describe three energy forms.
    D. List the four most common elements in the human body.
    E. Differentiate between elements and atoms.
    F. Describe and diagram the structure of an atom.
    G. Distinguish between an isotope and a radioisotope.
    H. Describe radioisotopes and their role in the diagnosis and treatment of disease.
    I. Explain the importance of chemical reactions and the role of electrons in chemical bonding.
    J. Explain the relationship between molecules and compounds.
    K. Differentiate between ionic, covalent, and hydrogen bonds and give two examples of each.
    L. Describe chemical reactions that occur in the body and give two examples of each.
V. Biochemistry

A. Distinguish between organic and inorganic compounds.
B. Differentiate between a salt, an acid, and a base and give one example of each.
C. Explain the importance of water for maintaining homeostasis in the body.
D. Three examples of the roles water plays in the body.
E. Explain what is meant by the concept of pH and identify the pH value for blood and urine.
F. Compare and contrast carbohydrates, lipids, proteins, nucleic acids and amino acids in terms of their functions in the body.
G. Identify the differences between structural and functional proteins.
H. State the differences between DNA and RNA in terms of their structure and function.
I. Define ATP and explain its importance in the body.
J. Define important terminology related to chemistry and biochemistry.

VI. Cells

A. Identify the general characteristics of a typical animal cell.
B. Explain how the structure of the cell membrane is related to its function.
C. Identify each cytoplasmic organelle on a diagram or slide and discuss the functions of each.
D. Describe the structures of a cell nucleus and its parts.
E. Describe the processes that transport materials in and out of a cell.
F. Predict whether cells will swell or shrink under various osmotic conditions.
G. Explain the process of DNA replication and of mitosis.
H. Describe and explain the importance of cell division.
I. Describe the stages of a cell=s life, and summarize the significance of mitosis with respect to maintaining a constant chromosome number.
J. Describe the roles of DNA and RNA in relation to protein synthesis.
K. List and describe the three types of RNA.
L. List and identify on a diagram or slide, the four major body tissues and explain their structural differences.
M. Identify the functions of the four major body tissues and identify their locations.
N. Compare epithelial with connective tissue.
O. Compare the three types of muscle tissue.
P. Compare connective tissues with epithelial membranes and contrast the types of epithelial membranes.
Q. Describe tissue repair.
R. Describe abnormal cell division as it relates to genetic diseases and cancer.
S. Define important terminology related to the cell.
VII. **Integumentary System**

A. List and describe the functions of the Integumentary system.
B. Describe the structure and function of the epidermis, dermis, and hypodermis.
C. Describe the function and importance of melanin.
D. Describe the structure of hair and nails and their growth processes.
E. Name three glands of the skin and describe their function.
F. List and describe the three classifications of burns.
G. Explain the importance of the rule of nines.
H. List and compare the structure of the major membrane types and locate each in the body.
I. Name three types of skin cancer and their causes.
J. Identify how aging affects the Integumentary system.
K. List and describe diseases/disorders associated with the Integumentary system.
L. Define important terminology of the Integumentary system.

VIII. **Skeletal System**

A. Identify the subdivisions of the skeletal system.
B. Differentiate between the axial and appendicular skeletal systems.
C. List five functions of the skeletal system.
D. Describe the structure of long bones and explain the functions of its parts.
E. List and give an example of the five classifications of bones.
F. Explain the role of bone salts and the organic matrix in making bone both hard and flexible.
G. Describe the process of bone formation.
H. Identify and name the bones of the skull.
I. Explain the function of the fontanel on a newborn skull.
J. Describe the differences between a newborn and an adult skull.
K. Name the parts of the vertebral column and describe their differences.
L. Identify and explain the three abnormal spinal curvatures.
M. On a skeleton, identify the parts of the axial and the appendicular system.
N. Differentiate between a male and a female pelvis and identify the reason for the differences.
O. Identify the three major classifications of joints and give examples of each.
P. Compare the main types of joints, and describe the structure and function of diarthrosis.
Q. List and describe the disease/disorders associated with the skeletal system.
R. Define important terminology of the skeletal system.
IX. Muscular System

A. Define the function of muscle.
B. Compare each of the three muscle tissue types.
C. Explain what is meant by the phrase muscles work in antagonistic pairs.
D. Identify the major parts of a skeletal muscle fiber and describe the functions of each.
E. Describe the major events that occur during muscle fiber contraction.
F. Identify ATP as the source of energy for muscle contraction and identify the source of energy for making ATP.
G. Differentiate between fast and slow muscles.
H. List the three different types of exercise and give examples of each.
I. Describe how stretch receptors in muscles and tendons are important in the body.
J. Describe how posture is maintained.
K. Explain how the location of muscles is adapted to their function.
L. Describe how the actions of muscles are coordinated to produce body movement.
M. Describe the location and action of major skeletal muscles throughout the body.
N. List and describe the characteristics of diseases/disorders associated with the muscular system.
O. Define important terminology of the muscular system.

X. Nervous System

A. Explain the anatomical and functional classification of the nervous system.
B. Identify the functions of neurons and neuroglia.
C. Draw a neuron, label its parts, and give the functions of each.
D. Classify three types of neurons in terms of their function.
E. List the events that lead to the generation of a nerve impulse.
F. Describe the four basic processes on which all neural responses depend.
G. Describe a reflex arc and explain how it is carried out by the nervous system.
H. List at least four types of sensory receptors and describe the functions of each.
I. Name the major parts of the brain and describe the functions of each.
J. Describe the coverings of the brain and spinal cord and describe how it is protected.
K. Discuss the formation and function of cerebrospinal fluid.
L. Describe the structure of the spinal cord and list two important functions.
M. List the major parts of the peripheral nervous system.
N. Name and describe the major plexuses.
O. Name the cranial nerves and list their major functions.
P. Explain how spinal nerves are named and describe their function.
Q. Describe the structure of a typical spinal nerve.
R. List and describe the subdivisions of the autonomic and limbic nervous system.
systems.
S. Compare and contrast the sympathetic with the parasympathetic.
T. Contrast the somatic and autonomic divisions of the peripheral nervous system.
U. Describe the sensory receptors associated with pressure, temperature, and pain.
V. Explain how the sensation of pain is produced.
W. List and describe disease/disorders associated with the nervous system.
X. Define important terminology of the nervous system.

XI. Special Senses

A. List five types of receptors and describe the function of each.
B. Describe how sensors receptors stimulate sensory impulses.
C. Describe how a sensation is produced.
D. Differentiate between somatic and special senses.
E. Describe the interrelationship between the sense of taste and the sense of smell.
F. Identify the parts of the ear and state their function.
G. Trace the transmission of sound through the ear.
H. Identify the parts of the eye and state the function of each part.
I. Describe how the body perceives depth and distance.
J. Outline the visual pathway.
K. List and describe diseases/disorders associated with special senses.
L. Define important terminology of the special senses.

XII. Endocrine System *this unit should be taught as part of all other systems.*

A. On a diagram, identify all the glands and tissues that make up the endocrine system.
B. Differentiate between endocrine and exocrine glands.
C. Describe the major endocrine glands of the body and list the hormones they secrete.
D. Differentiate between the anterior and posterior pituitary gland.
E. Define the term hormone and describe the functions of hormones.
F. Describe the functions of the hormones secreted by the endocrine glands.
G. Describe the transportation process of hormones and their interaction with target cell receptors.
H. Discuss how hormones promote homeostasis of the body and give three examples of hormonal actions.
I. Describe negative feedback, how it regulates hormonal secretions and give two examples.
J. Describe the functional relationship between the hypothalamus and the pituitary gland.
K. Differentiate between physical and psychological stress.
L. Describe the effects of aging on the endocrine system.
M. List and describe disease/disorders associated with the endocrine system.
N. Contrast the actions of insulin and glucagon.
O. Define important terminology of the endocrine system.

XIII. Lymphatic System

A. Describe the functions of the lymphatic system.
B. Explain how the lymphatic system is functionally related to the cardiovascular and lymphatic systems.
C. Describe the location of the major lymphatic pathways.
D. Describe the formation and composition of lymph and explain how it is transported through the lymphatic system.
E. Describe a lymph node and its major functions.
F. Locate the major chains of lymph nodes.
G. Describe the functions of the thymus and the spleen.
H. Explain the differences between specific and nonspecific body defenses and provide examples of each defense.
I. Define immunity and describe how T and B cells arise.
J. Explain the relationship between an antigen and an antibody.
K. Explain how allergic reactions and tissue rejection reactions are related to immune mechanisms.
L. List and describe disease/disorders associated with the lymphatic system.
M. Define important terminology of the lymphatic system.

XIV. Blood

A. Describe the functions of the lymphatic system.
B. Describe the composition of plasma and discussion its importance in the body.
C. Distinguish between the formed elements found in the blood.
D. Identify the stages involved in blood clotting and explain the various facets that promote and inhibit blood clotting.
E. Explain the basis for blood typing.
F. Describe how blood reactions may occur between the fetal and maternal tissues.
G. Explain the basis for physiological jaundice seen in some newborn babies.
H. List and describe disease/disorders associate with the blood.
I. Define important terminology related to the blood.
XV. **Cardiovascular System**

A. List the structures of the cardiovascular system and describe their functions.
B. Identify the major parts of the heart and describe their functions.
C. Describe the flow of blood through the heart.
D. Describe the coronary circulation.
E. Compare the structures and function of arteries, capillaries, and veins.
F. Explain the mechanism that helps in the return of venous blood to the heart.
G. Give the physiological basis for arterial pulse, and describe how pulse is measured.
H. Describe the factors which create and control blood pressure.
I. Define blood pressure and give its relationship to blood flow and resistance.
J. Explain and demonstrate how blood pressure is measured.
K. Contrast the pulmonary and systemic circuits of the cardiovascular system.
L. Trace a drop of blood through the pulmonary and systemic circulations.
M. List and describe diseases/disorders associated with the cardiovascular system.

M. Define important terminology of the cardiovascular system.

XVI. **Respiratory System**

A. Describe the general functions of the respiratory system.
B. List and describe the structure and organs of the respiratory system.
C. Describe the functions of the structures and organs of the respiratory system.
D. Describe the protective mechanisms in the respiratory system.
E. Describe the events involved in inspiration and preparation.
F. List and describe each of the respiratory air volumes.
G. Outline the types of non respiratory air movements and describe how each occurs.
H. Explain how the respiratory muscles cause volume changes that lead to air flow into and out of the lungs.
I. Describe the process of gas exchanges in the lungs and tissues.
J. Explain how respiratory gasses are carried by the blood.
K. Name the main areas involved in the control of respiration.
L. List three factors that influence respiratory rate.
M. Explain the major events that occur during cellular respiration.
N. Explain how oxygen is used by cells.
O. Trace the breath of air through the respiratory system from nose to
alveoli.
P. Describe the symptoms and probable causes of Chronic Obstructive Pulmonary Disease and lung cancer.
Q. Describe diseases/disorders associated with the respiratory system.
R. Define important terminology related to the respiratory system.

XVII. Digestive System

A. Name, describe and locate the structures and organs of the digestive system.
B. Describe the functions of the digestive system and the liver.
C. Describe the composition and functions of saliva.
D. Describe the basic anatomy of the teeth and oral cavity and explain their functions in the digestive system.
E. Describe the mechanism of swallowing, vomiting, and defecation.
F. Describe the mechanism peristalsis and its role in the G.I. tract.
G. List the enzymes secreted by the various digestive organs and describe the function of each.
H. Explain how gastric secretions are regulated.
I. List and describe the four layers of the wall of the G.I. tract.
J. Describe the structure and function of the liver and gall bladder.
K. Describe the pancreatic structure.
L. List and explain the digestive function of the pancreatic secretions.
M. Describe the structure and function of the small intestine.
N. Describe the structure and function of the large intestine and the rectum.
P. Explain how the processes in the stomach, liver, pancreas, gall bladder, and small intestines are coordinated.
Q. Describe the absorption of nutrients in the small intestine.
R. Define enzyme, metabolism, anabolism, and catabolism.
S. List in sequence each structure through which a bite of food passes on its way through the digestive system.
T. List and describe diseases/disorders associated with the digestive system.
U. Define important terminology related to the digestive system.

XVIII. Urinary System

A. List the structures and organs of the urinary system and describe their general functions.
B. Describe the location and the structure of the kidneys.
C. Describe the pathway of blood through the major vessels within a kidney.
D. Explain how a nephron works and describe how the major parts function.
E. Describe the production of glomerular filtrate and its composition.
F. Describe the factors which affect the rate of glomerular filtration and how it is
regulated.
G. Describe the role that tubular reabsorption plays in urine formation.
H. Describe the structure of the ureters, urinary bladder, and urethra.
I. List and describe diseases/disorders associated with the urinary system.
J. Define important terminology of the urinary system.

XIX. Water, Electrolyte, and Acid/Base Balance
A. Describe the various fluid compartments of the body.
B. Explain what is meant by water and electrolyte balance and discuss the importance of this balance.
C. Explain how electrolytes enter and leave the body and how the input and output of electrolytes are regulated.
D. Explain what is meant by acid/base balance.
E. Explain the functions of sodium, chloride, potassium, calcium, phosphate, and magnesium and regulation of their concentrations.
F. List the major sources of hydrogen used in the body.
G. Compare the role of buffers, exhalation of carbon dioxide, and kidney excretion of h+ in maintaining pH of body fluids.
H. List and describe disease/disorders associated with fluid, acid/base and electrolyte balance.
I. Define important terminology related to fluid, electrolyte, and acid/base homeostasis.

XX. Female Reproductive System
A. State the functions of the female reproductive system.
B. List the parts of the female reproductive system and describe the functions of each part.
C. Describe the structure of the ovary and how egg cells and follicles are formed.
D. Describe the role that hormones play in control of the female reproductive system and in the development of secondary sexual characteristics.
E. List the major events that occur during the menstrual cycle.
F. Describe the process of fertilization and identify the time of the menstrual cycle at which sexual intercourse is most likely to result in pregnancy.
G. Describe the major events of pregnancy.
H. Describe the functions of the amnion and placenta.
I. Describe the stages of birth and role that hormones play in this process.
J. Describe the structure and function of mammary glands.
K. Identify several methods of birth control and evaluate the effectiveness of each method.
L. Explain the symptoms and causes of sexually transmitted diseases.
M. List and describe diseases/disorders associated with the female reproductive system.
N. Define important terminology of the female reproductive system.
XXI. Male Reproductive System

A. State the function of the male reproductive system.
B. List the parts of the male reproductive system and describe the function of each part.
C. Name the endocrine and exocrine products of the testes.
D. Discuss the importance of semen and name the glands that produce it.
E. Describe the structure of sperm and relate the structure to its function.
F. Trace the pathway followed by sperm from the testes to the exterior of the body.
G. Explain the symptoms and causes of sexually transmitted diseases.
H. List and describe diseases/disorders associated with the male reproductive system.
I. Define important terminology related to the male reproductive system.