



UTICA COMMUNITY SCHOOLS

Course Title: Physiology

Course Content Expectations:

1. Introduction of Structure, Function and Homeostasis
 - 1.1 Analyze the relationship between structure and function
 - 1.2 Describe the six levels of structural organization of the human body
 - 1.3 Define metabolism and differentiate between anabolic and catabolic processes
 - 1.4 Identify the planes used to divide the body into portions
 - 1.5 Identify the location of abdominal quadrants and their organs
 - 1.6 Describe homeostasis and stress and compare their relationship
 - 1.7 Explain the components of negative feedback
 - 1.8 Identify directional terms used to determine body landmarks
2. Histology
 - 2.1 Differentiate the general functions of each of the principle types of tissue
 - 2.2 Compare and contrast exocrine and endocrine glands
 - 2.3 Differentiate the types of membranes and the location in the body
3. Integumentary System
 - 3.1 Identify and describe parts that make up the integumentary system and explain their overall function
 - 3.2 Characterize the major layers of the skin
 - 3.3 Explain the function of sudoriferous and sebaceous glands
 - 3.4 Explain how UV light causes skin cancers
 - 3.5 Examine the following diseases or disorders: acne, athlete's foot, decubitus ulcer, burns and cancers
4. Skeletal System
 - 4.1 Examine the general functions of the skeletal system
 - 4.2 Contrast the structural differences between compact and spongy bone
 - 4.3 Describe the structure and function of a typical long bone
 - 4.4 Categorize the four classes of bone and examine the characteristics of each
 - 4.5 Explain bone markings
 - 4.6 Differentiate between the axial and appendicular skeleton

- 4.7 Examine the general location and function of each of the five groups of vertebrae
- 4.8 Describe the structural and functional classifications of articulations
- 4.9 Evaluate the influence of aging, exercise and lifestyle on bone remodeling
- 4.10 Examine the following diseases or disorders: arthritis, fractures, herniated disc, spine curvatures, rickets, sprains, and osteoporosis

5. Muscular System

- 5.1 Examine the general function of the muscular system
- 5.2 Explain the four characteristics of muscle tissue
- 5.3 Compare the general location, microscopic appearance, control and functions of the three specific kinds of muscle tissue
- 5.4 Analyze the sliding-filament theory of muscle contraction
- 5.5 Describe the structures in muscle contraction and identify their role in the process
- 5.6 Differentiate between the terms origin and insertion as applied to muscles
- 5.7 Explain the role of antagonists and synergists
- 5.8 Discuss and demonstrate angular movements
- 5.9 Examine the following diseases or disorders: abnormal contractions, muscular dystrophy, myasthenia gravis, shin splints, strains

6. Nervous System

- 6.1 Discuss the three broad functions of the nervous system
- 6.2 Describe the general organization of the nervous system
- 6.3 Explain the structure and function of neurons and Schwann cells
- 6.4 Construct the major events of an action potential
- 6.5 Differentiate white and gray matter, including age related differences and changes
- 6.6 Examine the structures responsible for the maintenance and protection of the central nervous system
- 6.7 Identify the four principle parts of the brain
- 6.8 Describe CSF and identify the areas where it is typically located
- 6.9 Locate the three divisions of the brain stem and list their general functions
- 6.10 Identify the four lobes of the cerebrum and list their general functions
- 6.11 Explain the major functions of the cerebellum
- 6.12 Examine the following diseases and disorders: addictions, Alzheimer's, cerebral palsy, closed head injury, depression, meningitis, multiple sclerosis, Parkinson's, seizure disorders, spina bifida

7. Endocrine System

- 7.1 Examine the general functions of the endocrine system**
- 7.2 Identify and explain hormones and describe their functions in the body**
- 7.3 Identify and locate the major endocrine glands**
- 7.4 Discuss the major hormones of the endocrine glands and their functions**
- 7.5 Examine the following diseases or disorders: acromegaly, Addison's, diabetes mellitus, dwarfism, gigantism, goiter, Grave's, hyperthyroidism, seasonal affective disorder**

8. Lymphatic System

- 8.1 Examine the components of the lymphatic system**
- 8.2 Describe how lymph is moved throughout the body**
- 8.3 Differentiate antigens and antibodies**
- 8.4 Describe the general roles of the different types of T cells in cellular immunity**
- 8.5 Explain the role of the B cells in humoral immunity**
- 8.6 Distinguish between active and passive immunity, and natural versus artificial acquisition of immunity**
- 8.7 Examine the following diseases and disorders: AIDS, allergies, anaphylaxis, autoimmune, lymphoma, measles, mumps, rubella, tetanus, tissue rejection**

9. Cardiovascular System

- 9.1 Explain the general functions of the cardiovascular system**
- 9.2 Describe the layers of the heart**
- 9.3 Identify the great blood vessels of the heart**
- 9.4 Identify the valves of the heart**
- 9.5 Illustrate the blood flow through the heart**
- 9.6 Identify the components of the heart and trace its pathway**
- 9.7 Explain systole and diastole and identify the position of the heart valves during each phase of the cycle**
- 9.8 Discuss stroke volume and heart rate**
- 9.9 Identify the chambers of the heart and contrast work performed by each side**
- 9.10 Explain cardiac output and identify those factors that determine it**
- 9.11 Compare and contrast the structures and function of arteries, capillaries and veins**
- 9.12 Explain pulse and identify the general location of arteries at which pulse may be felt**
- 9.13 Explain blood pressure and describe how a sphygmomanometer is used to measure it**
- 9.14 Contrast pulmonary and systemic circuits**
- 9.15 Identify risk factors associated with cardiovascular disease**

- 9.16 Examine the following diseases or disorders: aneurysm, angina pectoris, arrhythmias, atherosclerosis, congestive heart failure, stroke, hyperlipidemia, murmurs, myocardial infarction, shock, valve disorders

10. Blood

- 10.1 Examine the formed elements of the blood, their development and general functions
- 10.2 Describe the structure of erythrocytes including hemoglobin
- 10.3 Explain leukocytes and describe their two major groups
- 10.4 Differentiate between plasma and serum
- 10.5 Examine hemostasis and identify its three stages
- 10.6 Contrast a thrombus and an embolus
- 10.7 Examine the following diseases and disorders: anemias, hemolytic disease of the newborn, hemophilia, LDL/HDL imbalances, leukemia, mononucleosis, polycythemia

11. Respiratory System

- 11.1 Examine the general functions of the respiratory system
- 11.2 Locate the organs of the respiratory system and describe the order in which air will pass through them from the exterior
- 11.3 Identify the three regions of the pharynx
- 11.4 Locate and explain the anatomical features of the larynx and associated structures
- 11.5 Identify the coverings of the lungs and anatomical features of the lung
- 11.6 Describe the site at which gas exchange occurs in the lung
- 11.7 Discuss the volumes and capacities of air exchange during ventilation
- 11.8 Differentiate between ventilation and external and internal respiration
- 11.9 Describe the effects of carbon dioxide on respiration
- 11.10 Examine the following diseases and disorders: asthma, cystic fibrosis, emphysema, influenza, pneumonia, respiratory distress syndrome, rhinitis, SIDS, tuberculosis

12 Digestive System

- 12.1 Examine the general functions of the digestive system
- 12.2 Contrast mechanical and chemical digestion
- 12.3 Differentiate between alimentary structures and accessory structures of digestion
- 12.4 Locate the salivary glands
- 12.5 Explain the functions of saliva and salivary amylase in digestion
- 12.6 Explain deglutition, mastication, maceration, segmentation and peristalsis

- 12.7 Identify the anatomical features of the esophagus and stomach
- 12.8 Discuss the four basic components of gastric juices
- 12.9 Locate and describe the digestive function of the pancreas
- 12.10 Locate and describe the digestive function of the liver
- 12.11 Describe the function of bile and the role of the gall bladder
- 12.12 Locate the three sections of small intestine and discuss associated intestinal enzymes
- 12.13 Explain two major mechanical movements of the small intestine
- 12.14 Examine the following diseases and disorders: anorexia nervosa, appendicitis, bulimia, cirrhosis, colon cancer, gallstones, hepatitis, hernia, obesity, ulcer, diverticulitis

13 Urinary System

- 13.1 Examine the general functions of the urinary system
- 13.2 Locate and identify the four major structures of the urinary system
- 13.3 Identify the anatomy of the kidney
- 13.4 Identify the microscopic structures of the nephron
- 13.5 Identify and describe the three basic physiological processes involved in urine formation
- 13.6 Discuss the physical characteristics and normal chemical constituents of urine
- 13.7 Compare the balance and measurement of fluid intake and output, including micturition, sweat, feces, exhaled vapor
- 13.8 Describe fluid and electrolyte balance
- 13.9 Examine the following diseases and disorders: incontinence, UTIs, diabetes insipidus, glomerulonephritis, kidney stones, renal failure

14 Reproductive System

- 14.1 Examine the general function of the reproductive system
- 14.2 Describe the anatomy of the male genitalia
- 14.3 Explain the function of the testes
- 14.4 Discuss the function of testosterone in the male
- 14.5 Describe the anatomy of the female genitalia
- 14.6 Explain the functions of the ovaries
- 14.7 Identify the structure and function of the uterine tubes
- 14.8 Describe the structure and function of the uterus, including the cervix, fundus, and its layers
- 14.9 Discuss the menstrual cycle
- 14.10 Describe the physiological effects of estrogen and progesterone
- 14.11 Contrast the general outcomes of mitosis versus meiosis

- 14.12 Contrast the general outcomes of spermatogenesis versus oogenesis**
- 14.13 Distinguish the sequence of events that occur during human development**
- 14.14 Explain the principal events associated with the stages of labor**
- 14.15 Describe genetic testing, such as amniocentesis and chorionic villus sampling**
- 14.16 Examine the following diseases and disorders: amenorrhea, cancers, endometriosis, impotence, infertility, premenstrual syndrome, STDs, toxic shock syndrome, yeast infections**