APPLIED ANATOMY AND PHYSIOLOGY
Pierce County Careers Connection
Dual Credit Articulation Agreement

Upon completion of high school courses equivalent to the following competencies:

- **Module 1: Organization of the Body**
  Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:
  - Define and give examples of cell, tissue, organ, and system.
  - Define survival, homeostasis, metabolism, and negative feedback.
  - Recognize and define the words used in describing body structures (i.e. planes, superior versus inferior.)
  - List the names of the various body cavities and the organs contained in each.
  - Describe the effect of aging on body function.
  - Label the structural parts of a human cell and explain the function of each part.
  - Define gene and explain how a gene determines heredity.
  - Identify the different stages of mitosis and describe what events occur during each stage.
  - List and give the characteristics of the four kinds of tissues composing all organs of the body.
  - List and give characteristics of the two kinds of membranes (epithelial and serous). Also discuss the cutaneous membrane.

- **Module 2: Integumentary, Skeletal, and Muscular Systems**
  Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:

  **Integumentary System**
  - Describe the three layers of the skin.
  - Describe the structure of the hair follicle.
  - Describe the function of the sebaceous and sweat glands.
  - List and describe the four functions of the skin.

  **Skeletal System**
  - List the five functions of the skeletal system.
  - Define and identify the parts of the long bone.
  - Name the two types of bone tissues.
  - Identify and give the function of the microscopic structures of bone and cartilage, and describe the process of bone formation and growth.
  - Name the two divisions of the skeletal system and describe the bones in each division.
  - Identify all the major bones of the skeleton and define the terms relating to the projections, cavities, and fossa of these bones.
  - List and discuss the facial and cranial bones.
  - List the differences between the male and female pubic bones.

- **Module 3: Nervous and Endocrine Systems**
  Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:

  **Nervous System**
  - Name the divisions of the nervous system and list the organs contained in each.
  - Review the structure of the neuron and discuss the function of each of its parts.
  - Define the term synapse and name the three kinds of

- Give two functions of the joints.
- List the various kinds of joints based on the degree of movement allowed and give an example of each.
- Name the four different kinds of synovial joints and give one example of each.
- Describe what happens to joints, as a person grows older.

  **Muscular System**
  - List the three kinds of muscle tissues.
  - Describe skeletal muscle structure.
  - Explain skeletal muscle function and identify the microscopic structure.
  - Define the following terms that relate to skeletal muscle contractions:
    - Excitability
    - Contractibility
    - Tone
    - Isotonic
    - Isometric
    - Elasticity
  - Define the types of movements produced by skeletal muscles.
  - Define the term intramuscular injection and name the muscles used for this procedure.
  - Briefly describe the following muscle disorders.
    - Muscle spasms
    - Contractures
    - Myasthenia gravis
    - Atrophy
    - Paralysis
    - Muscular dystrophies
    - Strains
    - Twitch
    - Tetanus
    - Fibrillation
    - Convulsions
    - Spasticity
  - Identify the major muscles of the body.
  - Give the main flexor, extensor, abductor, and adductor for these body parts: upper arm, lower arm, thigh, lower leg, foot, and trunk.
neurons in a reflex arc and give the function of each.
- Define the term neurotransmitter stating the function and place they are released.
- Name other kinds of chemical neurotransmitter molecules.
- List two functions of the spinal cord.
- Explain the function of the spinal tracts.
- Define and discuss the terms: ventral, dorsal roots, and mixed nerves.
- List in sequence the events that take place when a stimulus acts on a neuron.
- Name the major regions (lobes) of the brain and list the structures found in each region.
- List eight functions of the hypothalamus.
- Define the terms: gyri, sulci, white matter, and grey matter.
- Discuss the functions of the four lobes of the cerebrum.
- List three reflex centers located in the brain stem and give the functions of each.
- State the function of the cerebellum.
- Explain briefly what is meant by the term CVA.
- Describe how the central nervous system is protected against injury.
- Describe how cerebrospinal fluid is produced and traced its pathway.
- For each cranial nerve: correctly locate, identify, and state where and to where they conduct nerve impulses.
- Discuss the effects of aging on the nervous system.

**Autonomic Nervous System**
- Name and give the location in the body if the two divisions of the autonomic system.
- State the function of the sympathetic divisions of ANS.
- Describe what is meant by the "fight or flight syndrome".
- Compare the number of organs involved in the sympathetic stimulations with the number of organs involved in parasympathetic stimulation.

**Sensory System**
- Name four kinds of special sense receptors.
- Name four kinds of sensations perceived by skin receptors.
- Identify and give the function of the structures of the eye.
- Identify and give the function of the structures of the ear.

**Endocrine System**
- Discuss the structure of the glands.
- List the two functions of the endocrine system.
- Name and locate eight major endocrine glands and the hormones they secrete. Be able to explain what each hormone does for the body.

**Endocrine System (cont’d)**
- Discuss the major disease (as listed below) caused by hyperfunction of hypofunction of the major endocrine glands.
  - Gigantism
  - Goiter
  - Exophthalmimos
  - Cretins
  - Myxedema
  - Tetany
  - Dwarfism
  - Addison’s Disease
  - Acromegaly
  - Cushing’s syndrome
  - Diabetes Mellitus
  - Diabetes Insipidus
- Explain how protein hormones are believed to exert their effects.

**Module 4: Circulatory and Lymph Systems**
Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:

**Blood**
- Identify the tissue structure of blood, total amount found in the average adult, and the functions of the circulatory system.
- Describe the three kinds of formed elements found in the blood, and list their normal values per cubic millimeter.
- Define stem cell and state its function.
- List the characteristics of red blood cells and give their functions.
- Name the substance in red blood cells that combine with oxygen.
- Define anemia and give a brief description of the following conditions:
  - Iron deficiency anemia
  - Pernicious anemia
  - Aplastic anemia
  - Hemolytic anemia
  - Sickle cell anemia
  - Polycythemia
- Discuss what components are needed to form healthy and mature red blood cells.
- Define these lab tests:
  - Hemoglobin
  - Hematocrit
  - CBC
  - WBC
  - Differential
- Name the five different kinds of white blood cells and give the function of each.
- Review the term phagocytosis.
- Define serum.
- Define and explain the general function of an antigen and an antibody.
- List the three major blood types.
- Explain the terms universal donor and universal recipient.
- Define the term RH positive.
- Briefly explain the consequences if a RH – mother and a RH + father have several RH + children.

**Cardiovascular**
- State the location, size, structures, and position of the heart.
- Trace a drop of blood from right atrium to the aorta of an adult, listing in sequence all the vessels, valves, and chambers of the heart.
~Define the term CPR and explain how this process can be lifesaving.
~List in sequence the structures involved in the spread of an electrical impulse through the heart.
~Define:
  ~Heart rate
  ~Bradycardia
  ~Tachycardia
  ~Stroke volume
  ~Cardiac output
  ~Cardiac cycle
~Discuss coronary circulation.
~Explain what happens when a coronary artery becomes blocked.
~Define:
  ~Collateral circulation
  ~Anastomoses
  ~Ischemia
~Name three kinds of blood vessels and state the direction in which they carry blood, and discuss their function.
~Describe two circuits of the vascular system.
~State the function of the hepatic portal circulation and the advantage of having venous blood pass through the liver before returning to the heart.
~Briefly explain blood pressure and define the words:
  ~Systolic pressure
  ~Diastolic pressure
  ~Pulse pressure
  ~Pulse
~Define congestive heart failure.
~List and locate on yourself seven different places where a pulse can be taken.
~Discuss the effects of aging on the cardiovascular system.
~Define the term lymph and describe how it is formed.
~Explain how the lymphatic system is part of the circulatory system; discuss the functions of the lymphatic system, and list the organs that comprise this system.
~State two main functions of lymph nodes.
~Explain how a nurse can use knowledge of lymph node location.
~Review the structure and function of the thymus gland.
~List three functions of spleen, state how much blood can be stored in the spleen, and discuss the advantages of this blood storage to the human body.
~Review the location and function of the tonsils.

Immune System
~Name three major kinds of “enemies” against which the immune system provides protection.
~Discuss the two kinds of lymphocytes as to their origin, how each is activated, and how each function to protect the body.
~Discuss the effects of aging on the immune system.

Module 5: Digestive, Respiratory, and Urinary Systems Waste Elimination
Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:
~List in sequence the main organs of the digestive tract that food would pass through the mouth to the anus. As each organ is discussed included the following objectives:
~Identify the structures that form the floor, sides, and roof of the mouth, as well, as the accessory structures located in the oral cavity.
~Compare the number of each of the different kinds of teeth in the deciduous and permanent arch.
~State the age at which the different kinds of teeth erupt.
~Define the term dental caries and state the cause and method of prevention of this problem.
~Discuss the consequences of untreated tooth decay.
~List the three salivary glands, their location, and the function of their secretions.
~Locate the pharynx and list its two functions.
~Describe the esophagus in terms of its lining, location, and the organs with it connects. Include the definition of peristalsis and its function.
~Describe the structures that make up the stomach give the function of each, list two secretions of the stomach.
~Name the three parts of the small intestine in order in which food passes through them.
~Describe the structure and function of a villus and lacteal.
~Identify and give the function of the structures which make up the large intestines, including the appendix.
~List the two functions of the digestive tract.
~Name the three kinds of processing that foods undergo. State where these processes take place in the body and why they are necessary.
~List two functions of the gallbladder.
~Define bile and list the sequence of structures that bile passes through from the liver to the duodenum.
~Explain the consequences of obstruction of either the hepatic of common bile duct by stone or spasm, and define the term jaundice.
~Name the exocrine products of the pancreas and state their functions.
~Define the term peritoneum and state its function.
~Define the terms: chemical digestion and absorption. Then describe the processes involved in the digestion and absorption of carbohydrates, proteins, and fats.
~Define metabolism, and then list the two processes that make up metabolism.
~Discuss the effects of aging on the digestive system.

Respiratory System
~List the six functions of the respiratory system.
~Discuss the following structures of the respiratory tract and include functions and common disorders.
  ~Nose
  ~Pharynx
  ~Larynx
  ~Trachea
  ~Bronchus
  ~Bronchioles
  ~Alveoli
  ~Lungs
~Describe the pleural membranes and their functions.
~Define Pleurisy and Pneumothorax.
~Name the substance that is the most important air purification mechanism in the respiratory system.
~Discuss the effects of smoking on the respiratory system.
~Explain the Heimlich maneuver.
Differentiate between external and internal respiration.
List the structures involved in the mechanics of breathing. Briefly describe the process.
List the lab tests done to determine lung capacity and blood gas levels.
Define carboxyhemoglobin and oxyhemoglobin.

Urinary System
- Identify structures of the urinary system.
- List functions of the kidneys.
- Define retroperitoneal.
- Explain why it is necessary to keep high rate of blood pressure and blood flow in the renal circulation.
- Describe the structure and function of the nephron.
- Describe the three processes involves in urine formation and where each occurs in the nephron.
- Define the following terms:
  ~Hemodialysis
  ~Urinary retention
  ~Urinary suppression
  ~Incontinence
  ~Catheterization
- Describe how the body controls the amount and composition of the urine it secretes.
- List in sequence the parts of the urinary system that a drop of urine would pass through from the glomerulus to the urinary meatus.
- Describe how the ureters facilitate the movement of urine to the bladder.
- Describe the location, structure, and function of the urinary bladder.
- Contrast the functions of the urethra in men and women.

Module 6: Reproductive System
Upon completion of this module students will, in a group discussion, in a written paper, or on written exam, be able to:

Male Reproductive System
- Name the essential organs, ducts, supportive sex glands, and the parts of the external genitalia and give the function of each.
- Define these terms:
  ~Orgasm
  ~Ejaculation
  ~Circumcision
  ~Vasectomy
  ~Cryptorchidism
  ~Prostatic hypertrophy
- Describe two functions of testosterone and where it is produced.

Male Reproductive System (cont’d)
- Define spermatogenesis and why an alkaline environment is desirable.
- State the function of sperm.
- List in sequence the various structures through which sperm passes from the testes to the urethral orifice of the male.
- Define the term semen. Give the name and function of the different glands whose secretions form part of the semen.
- Distinguish between sterility and impotency.

Female Reproductive System
- Name the organs, ducts, two kinds of accessory glands, and the eight structures that make up the external female genitalia.
- List three functions of the ovaries.
- State three functions of estrogen and two functions of progesterone.
- List in sequence all the structures an ovum would pass on its trip from the ovary to the body of the uterus.
- Define the terms:
  ~Ectopic pregnancy
  ~Menarche
  ~Menopause
  ~Hysterectomy
- Describe the structure and function of the vagina.
- State the location and function of the Bartholin’s glands.
- Explain what happens to the uterus during the menstrual phase, post-menstrual phase and premenstrual phase.
- Explain why the time of ovulation is of great practical importance.
- Describe the hormonal changes that cause the menstrual cycle.
- Define the following disorders of the female reproductive system.
  ~Cancer of the cervix
  ~Bartholin cyst of abscess
  ~Endometriosis
  ~Dysmenorrhea
  ~Amenorrhea
  ~Infertility

A student earning a “B” grade or better may earn college credit at the following college:

<table>
<thead>
<tr>
<th>College</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Bates Technical College</td>
<td>PNURS 103</td>
<td>5.5</td>
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