ANPH 209 - Anatomy and Physiology

Course Description:
Anatomy and Physiology provides learners with an overview of the anatomy and basic physiology of the human body. Areas that will be covered include the organization of the body; covering, support, and movement of the body; regulation and integration of body functions; maintenance of the body; and continuity of the human race. Diseases and aging processes will also be briefly discussed.

3 Credits

Time Guidelines:
The standard instructional time for this course is 45 hours.

Effective Year
2020/2021

Course Assessment:

Quizzes	50%
Final Exam	30%
Assignments	20%
Total:	100%

Other Course Information:
School of Health and Public Safety Attendance Guideline

The School of Health and Public Safety (HPS) has expectations, consequences and processes for excused absences approval and review related to attendance. The entire Attendance Guideline may be found on the HPS pre-orientation resources website at: sait.ca/hpsorientation. This document is located under the General Resources section found on your Program page. **Students are expected to review the entire Attendance Guideline**. In particular, students are asked to take note of the attendance expectations shown below.

Attendance Expectations

Students in the School of Health and Public Safety are expected to achieve 100% attendance for scheduled classes and to participate in any learning activities on a regular basis. There is a positive correlation between attendance, participation and grades. Failure to keep up with course work or repetitive and cumulative absences will result in a formal review of the student's progress.

A successful, well-rounded and job-ready Allied Health graduate must demonstrate the necessary knowledge, skills and abilities while attending both SAIT and workplace learning experiences.

The School of Health and Public Safety (HPS) expects students to:

- Attend all gradable components up to, and including, the last day of the final exam week.
- Arrive early and be prepared for all gradable components.
- Act as a responsible leader by modeling professional attendance behaviour and being accountable for personal actions. This is demonstrated by communicating and documenting personal disruptions to instructors and or preceptors, if applicable.
- Communicate and document any current and/or upcoming personal disruptions as early as possible to his/her instructor, preceptors and/or Academic Chair.
- Contact instructor(s) on the first day of return to the program after an absence to make arrangements for missed time, if allowed.
- Schedule personal appointments outside of program schedules when possible.
- Complete the SAIT Physician Statement form when requesting a deferred gradable course component and submit the form to the Academic Chair.
- Discuss and ensure any changes to a course or workplace schedule are approved by the SAIT instructor and/or Academic Chair.
- Schedule a meeting with the Academic Chair to discuss any extended illness or medical leaves, accessibility requirements, or accumulated absences or chronic lateness.

SAIT Policies and Procedures:
For information on the SAIT Grading Scale, please visit policy AC 3.1.1 Grading Progression Procedure: http://www.sait.ca/Documents/About SAIT/Administration/Policies and Procedures/AC.3.1.1 Grading and Progression Procedure.pdf

For information on SAIT Academic Policies, please visit: www.sait.ca/about-sait/administration/policies-and-procedures/academic-student

Required Course Publication(s):
Tortora, G., & Derrickson, B. (2016). *Principles of anatomy & physiology* (15th ed.). Hobeken, NJ: Wiley Plus.

Course Learning Outcome(s):
1. Explain the organization of the human body.

    Objectives:

        1.1 Identify the survival needs of the body systems.

        1.2 Describe the body functions necessary to maintain life.

        1.3 Explain the role of negative and positive feedback in homeostasis.

        1.4 Describe the anatomical positions and planes of the human body.

        1.5 Identify the major body cavities and subdivisions, and the major organs contained within each.

        1.6 Describe the membranes of the ventral body cavity.

2. Explain the chemical foundations of the body.

    Objectives:

        2.1 Explain the different types of chemical bonds.

        2.2 Describe carbohydrates, lipids, proteins and nucleic acids.

2.3 Explain the importance of water to the body.

2.4 Describe acid-base concentration and pH scale.

2.5 Discuss the structural level, classification and stability of proteins.

2.6 Describe adenosine triphosphate (ATP).

3. Explain the structure, nature and function of a typical cell.

Objectives:

3.1 Identify parts of a typical cell.

3.2 Identify the structure and functions of the plasma membrane.

3.3 Describe the basic characteristics and functions of the cytoplasm, organelles, and inclusions.

3.4 Compare the types of passive plasma membrane transport.

3.5 Compare the effects of various solutions on red blood cells.

3.6 Explain the processes involved in vesicular transport.

4. Explain the structure, nature and functions of body tissues.

Objectives:

4.1 Name the four classifications of body tissues.

4.2 Describe the characteristics and categorization of epithelial cells.

4.3 Describe the characteristics and structural elements of connective tissue.

4.4 Describe cartilage and its uniqueness from other connective tissue.

4.5 Describe the characteristics of muscle tissue.

4.6 Describe the characteristics of nervous tissue.

4.7 Explain the process of tissue repair.

4.8 Describe how age-related tissue changes may affect one’s health.

5. Explain the structure, nature and functions of the integumentary system.

Objectives:

5.1 List the functions of the integumentary system.

5.2 Identify the structures contained within the skin.

5.3 Describe the cells and layers of the epidermis.

5.4 Describe the dermis and epidermis.

5.5 Describe how pigments contribute to skin color.

5.6 Compare the structure and locations of sweat and oil glands.

5.7 Describe the structure and function of hair.

5.8 Relate the parts of the nail to their function.

5.9 Explain how burns affect the body.

6. Explain the structure, nature and functions of the skeletal system.

Objectives:

6.1 Describe the basic structure, types and locations of skeletal cartilage.

6.2 Classify bone structure according to size and shape.

6.3 Describe the functions of bones in the skeletal system.

6.4 Explain the chemical composition of bone.

6.5 Compare compact and spongy bone including the location of the red marrow in each.

6.6 Describe the pathological processes and aging issues common to the skeletal system.

6.7 Discuss the processes by which bones develop, grow, are remodeled and repaired.

7. Explain the structure, nature and functions of bones and joints.

Objectives:

7.1 Identify the major bones of the axial skeleton and the appendicular skeleton.

7.2 Describe the special characteristics of orbits, nasal cavity and the paranasal sinuses.

7.3 Identify the regions, curvatures and vertebral characteristics of the spine.

7.4 Describe the classification, composition and function of joints.

7.5 Describe the structural characteristics of synovial joints.

7.6 Describe common and special body movements allowed by synovial joints.

8. Explain the structure, nature and functions of the muscular system.

Objectives:

8.1 Describe the microscopic anatomy of a skeletal muscle fiber.

8.2 Describe the siding filament model of muscle contraction.

8.3 Explain the physiology of skeletal muscle fibers.

8.4 Explain the relationship between muscle contractions and motor units.

8.5 Explain the muscle response to change in stimulus strength.

8.6 Compare isometric contraction, isotonic contraction, and muscle tone.

8.7 Explain muscle metabolism and the three ways adenosine triphosphate (ATP) is generated.

8.8 Describe the functions of prime movers, antagonists and synergist muscles in the body.

8.9 Describe the major superficial muscles of the anterior and posterior surfaces of the body.

9. Explain the structure, nature and functions of the nervous system.

Objectives:

9.1 Describe the organization and functions of the nervous system divisions.

9.2 Describe the structure and functions of neurons and neuroglia.

9.3 Describe the structure and function of each component of a neuron.

9.4 Discuss membrane potentials and how they act as signals.

9.5 Explain the propagation of an action potential.

9.6 Identify the structural and functional differences between electrical and chemical synapses.

9.7 Identify neurotransmitters and their effects on skeletal muscle.

10. Compare the central and peripheral nervous systems.

Objectives:

10.1 Relate parts of the brain with their respective functions.

10.2 Associate the three functional areas of the cerebral cortex with their corresponding lobe.

10.3 Relate parts of the spinal cord with its respective functions.

10.4 Explain how cerebrospinal fluid is made as well as its purpose.

10.5 Identify the cranial and spinal nerves and their functions.

10.6 Describe the innervation of specific body regions.

10.7 Discuss spinal reflexes.

10.8 Compare the somatic nervous system with the autonomic nervous system and their subdivisions.

11. Explain the structure, nature and functions of the special senses.

Objectives:

11.1 Describe the gustatory organs including their structure and physiology.

11.2 Describe the olfactory organs including their structure and physiology.

11.3 Relate the accessory structures of the eye with their functions.

11.4 Associate the structures of the eye and their functions with the physiology of vision.

11.5 Outline the visual pathway to the brain.

11.6 Associate the structures of the ear and their functions with the physiology of hearing.

12. Explain the structure, nature and functions of the endocrine system.

Objectives:

12.1 Explain the general mechanism of hormone action.

12.2 List the main effects of anterior and posterior pituitary hormones.

12.3 Describe the effects of the hormones produced by the thyroid.

12.4 Explain the importance of the hormone produced by the parathyroid glands.

12.5 Compare the hormones produced by the two functional layers of the adrenal glands.

12.6 Contrast the effects of the two major pancreatic hormones.

13. Explain the structure, nature and functions of blood and blood vessels.

Objectives:

13.1 Describe the functions, characteristics, and components of blood.

13.2 Describe the processes that constitute hemostasis.

13.3 Describe the composition of blood plasma.

13.4 Describe the structure of erythrocytes, leukocytes and platelets and their common disorders.

13.5 Explain blood typing.

13.6 Describe the function of arteries, arterioles, veins, venules, and capillaries.

13.7 Describe blood flow and the regulation of blood pressure.

13.8 Describe circulatory shock.

14. Outline the structure, nature and functions of the cardiovascular system.

Objectives:

14.1 Explain pulmonary, systemic and coronary circulation.

14.2 Describe the location and function of the heart valves.

14.3 Explain what creates the heart sounds.

14.4 Describe the heart's conduction system and cardiac cycle.

14.5 Explain congestive heart failure, angina pectoris and myocardial infraction.

14.6 Explain how a fetal heart differs from an adult heart.

14.7 Describe both the pathological processes and aging issues common to the cardiovascular system.

15. Explain the structure, nature and functions of the lymphatic and immune systems.

Objectives:

15.1 Describe the structures of the lymphatic and immune systems.

15.2 Describe the functions of the lymphatic and immune systems.

15.3 Explain how lymph is pumped throughout the body.

15.4 Explain the body's innate internal defenses.

15.5 Describe the body's adaptive defenses.

15.6 Detail the process of creating humoral immunity in the body.

15.7 Describe the cell mediated immune response.

16. Explain the structure, nature and functions of the respiratory system.

Objectives:

16.1 Identify the major respiratory organs and structures around them.

16.2 Describe the functions of respiratory structures.

16.3 Describe the structure and coverings of the lungs.

16.4 Describe the mechanics of breathing.

16.5 Explain gas exchange and the transport of respiratory gases by blood.

16.6 Describe the controls of respiration.

16.7 Describe both the pathological processes and aging issues common to the respiratory system.

17. Explain the structure, nature and functions of the digestive system.

Objectives:

17.1 Describe the major processes of the digestive system.

17.2 Explain the blood supply of the digestive system.

17.3 Describe the four layers of the alimentary canal.

17.4 Describe the structure and function of both the main organs and accessory organs of the digestive system.

17.5 Describe the chemical digestion of carbohydrates, proteins, lipids and nucleic acids.

18. Explain the structure, nature and functions of the urinary system.

Objectives:

18.1 Describe the functions of the urinary system.

18.2 Identify the structure and the functions of nephrons and associated blood vessels.

18.3 Outline the processes involved in the formation of urine.

18.4 Describe the role of antidiuretic hormone, aldosterone, atrial natriuretic factor, renin, and erythropoietin.

18.5 Describe the structure and function of the ureters, urinary bladder and the urethra.

18.6 Describe how micturition is controlled.

19. Summarize the structure, nature and functions of the reproductive system.

Objectives:

19.1 Describe the structure and function of the male reproductive organs and accessory glands.

19.2 Describe the neural control of the male sexual response.

19.3 Describe the hormonal control of the male and female reproductive systems.

19.4 Describe the structure and function of the female reproductive organs and associated glands.

19.5 Describe the menstrual cycle and menopause.

19.6 Define fertilization, gestation, parturition and lactation.
