



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**HUMAN ANATOMY AND PHYSIOLOGY
BIO4150 5 Credit Hours**

Student Level:

This course is open to students on the college level in the freshman or sophomore year.

Catalog Description:

BIO 4150 - HUMAN ANATOMY AND PHYSIOLOGY (N) (5 hrs)

[KRSN BIO 2020]

A detailed study of the structure and function of the human body. Laboratory work includes tissue examination, basic physiological experiments, and structural identification of all organ systems.

Prerequisite:

The student must complete one of the following: BIO4111 Principles of Biology, BIO4110 Biology Review, or successful completion of a life science lab class within the past five years.

Controlling Purpose:

This course is designed to provide students with a thorough study of the anatomy and physiology of the human body.

Learner Outcomes:

Upon completion of the course, students will have an understanding of the structural levels of body organization, of the gross and microscopic anatomy of the body systems, of the concept of homeostasis, and of the physiology of each body system. Those students entering professional training in the health sciences will be at a level of competency required in that training.

The learning outcomes and competencies detailed in this course meet, or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Project for this course, as sanctioned by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT I: INTRODUCTION TO THE HUMAN BODY: STRUCTURAL ORGANIZATION, HOMEOSTASIS, ANATOMICAL TERMINOLOGY

Outcomes: Upon completion of this unit the student will gain an understanding of the organization and terminology associated with the human body.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Define each of the following levels of structural organization: cellular, tissue, organ systems, and organism.
						Identify the systems of the body and describe the basic function of each system.
						Contrast a negative feedback system with a positive feedback system.
						Describe the anatomical position.
						Locate and name, using anatomical terminology, the body surface regions.
						Describe the planes that divide the body.
						Locate and name each abdominopelvic region.
						List and define the boundaries of the body cavities.
						List the organs or parts of organs located in each body cavity.

UNIT 2: TISSUES

Outcomes: Upon completion of this unit the student will gain an understanding of characteristics of the types of tissues.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe the features, locations, and functions of epithelium.
						Describe the features, locations, and functions of connective tissues.
						Describe the structural features and functions of nervous tissue.
						Contrast the structural features, locations, and modes of control of the three types of muscle tissue.
						Using prepared slides and a compound microscope; demonstrate the recognition of types of connective, epithelial, muscle and nerve tissues.

UNIT 3: THE INTEGUMENTARY SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the importance of the skin and its derivatives.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to use:
						Describe the anatomy and physiology of the skin and its epidermal derivatives.
						Compare the anatomy, distribution and physiology of hair, sebaceous, sudoriferous and ceruminous glands.
						Explain the role of the skin in maintaining the homeostasis of normal body temperature.

UNIT 4: THE SKELETAL SYSTEM:**BONE FORMATION, THE AXIAL SKELETON, THE APPENDICULAR SKELETON, AND JOINTS.**

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the skeleton.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to use:
						Contrast the formation of endochondral and intramembranous bone.
						Describe the role of bone in homeostasis.
						Identify the parts of a long bone.
						Identify the bones of the skull and the major markings associated with each.
						Identify the principal sutures, fontanel, sinuses and foramina of the skull.
						Identify the bones of the axial skeleton and their principal markings.
						Identify the bones of the appendicular skeleton and their principal markings.

UNIT 5: THE MUSCULAR SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the mechanism of muscle contraction and movement.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Identify ten components of a skeletal muscle on the biochemical-subcellular level.
						Explain how the biochemical-subcellular muscle parts engage to shorten a muscle.
						Sketch the graphical patterns of muscle contraction for twitch, summation, tetanus, fatigue and treppe.
						Compare and contrast the role of isotonic and isometric contractions in body movements and positions.
						Explain how muscles in a group interact to produce a basic body motion such as forearm flexion, leg extension.
						Appraise the contribution of skeletal muscle in maintaining homeostasis.
						Locate and identify on cadaver replicas and diagrams the principal skeletal muscles of the head, neck, trunk and limbs.
						Summarize the origins, insertions, actions and innervations of the principal head, neck, trunk, and limb muscles.

UNIT 6: THE NERVOUS SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the process of nervous system function and structure.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Classify the organs of the nervous system into central and peripheral divisions.
						Describe the functions of neuroglia.
						Describe the structure and functions of neurons.
						Compare the basic types of ion channels and explain how they relate to action potentials.
						Outline a flowchart showing the series of steps for the development and implementation of an action potential.
						Distinguish between spatial and temporal summation.
						Describe the types of neuronal circuits in the nervous system.
						Prepare a labeled diagram illustrating the initiation of an impulse in a presynaptic neuron and the transmission of the impulse across a synapse to a postsynaptic neuron.
						Describe the protection, gross anatomical features and cross sectional structure of the spinal cord.
						Describe the functions of the principal sensory and motor tracts of the spinal cord.
						Describe the components of a reflex arc and its relationship to homeostasis.
						List and describe three clinical important reflexes.
						Describe the composition and coverings of a spinal nerve.
						Describe how the brain is protected.
						Explain the formation and circulation of cerebrospinal fluid.
						Describe the blood supply to the brain and the concept of the blood-brain barrier.
						Compare the structures and functions of the brain stem, diencephalon, cerebrum, and cerebellum.
						List four neurotransmitters formed in the brain and give their functions.
						Identify the twelve pairs of cranial nerves by name, number, type, location, and function.
						Compare the structural and functional differences between the somatic and autonomic nervous systems.

UNIT 6: THE NERVOUS SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the process of nervous system function and structure.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Compare the sympathetic and parasympathetic divisions.
						Explain the relationship of the hypothalamus to the autonomic nervous systems.

UNIT 7: THE ENDOCRINE SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the hormonal control systems of the body.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Compare the four chemical classes hormones.
						Describe the control of hormone secretions via feedback cycles.
						Describe the anatomy and the hormones of the pituitary gland.
						Relate the relationship of the hypothalamus to the anterior and posterior pituitary.
						Describe the actions of the hormones of the thyroid, adrenal glands, pancreas, parathyroids, ovaries and testes.
						Compare homeostatic and stress responses.
						Predict the homeostatic malfunctions caused by imbalances in connection of (1) growth hormone, (2) ADH, (3) thyroid hormone, (4) calcitonin, (5) insulin, and (6) glucocorticoids.
						Differentiate between the regions and hormones of the adrenal gland.
						Outline the relationship of three hormones controlling blood glucose.

UNIT 8: THE CARDIOVASCULAR SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the heart, vessels and blood.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Discuss erythrocyte, leukocyte and platelet formation.
						Differentiate between the five leukocyte types by three criteria.
						Construct a flow chart describing the events in the blood clotting pathways leading to the formation of fibrin.
						Describe the heart's location, size, and position.
						Organize an outline of heart anatomy based on chambers, valves, and attached blood vessels.
						Label the segments of an unlabeled ECG and match each event to a cardiac cycle occurrence.
						Given any two of three variables (cardiac output, heart rate, and stroke volume), solve for the value of the third.
						Given a random list of cardiac cycle events, rank the list in their logical order of occurrence.
						Explain the functions of the lymphatics.
						Distinguish between lymph and plasma.

UNIT 9: THE RESPIRATORY SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the respiratory system.

						Specific Competencies
						Demonstrate the ability to:
						Rank the respiratory compartments in the order exhaled air encounters them.
						Explain how Boyle=s Law facilitates understanding of the inhalation - exhalation cycle.
						Explain how Dalton=s Laws facilitate understanding of gas exchange.
						Explain factors that regulate the rate and depth of respiration.
						Given three of four air volumes (VC, TV, IRV, and ERV), calculate the fourth.
						Distinguish between external and internal respiration.

UNIT 10: THE DIGESTIVE SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the digestive system.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Select twenty GI segments and subsegments and rank them in order a moving food mass encounters them.
						Construct a table depicting where the carbohydrates, lipids, and proteins in a cheese sandwich are progressively digested throughout the GI tract.
						Differentiate between mechanical and chemical digestion.
						Differentiate among the cephalic, gastric, and intestinal phases of gastric secretion.
						Outline how the hormones gastrin, secretin, and enterogastrone integrate to regulate GI activity on a meal high in proteins and lipids.

UNIT 11: THE EXCRETORY SYSTEM

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the excretory system.

						Specific Competencies
						Demonstrate the ability to:
						List all parts and regions of the kidney=s gross anatomy, external and internal.
						List all microscopic components of kidney anatomy.
						Predict the change in water balance of the body by ADH deficiency.
						Compare how glomerular filtration, tubular reabsorption, and tubular secretion each function to maintain water and electrolyte balance.
						Evaluate the effectiveness of urinalysis to detect abnormal chemical states of the body.
						Explain how body water is distributed into compartments.
						Discuss abnormal states causing edema.
						Label sites in nephron anatomy for pH adjustment and explain the events.
						Compare the usual difference in pH for arterial and venous blood.
						Relate buffer pair action to respiratory and renal mechanisms as they comprehensively maintain ECF pH.

UNIT 12: THE REPRODUCTIVE SYSTEMS AND DEVELOPMENT

Outcomes: Upon completion of this unit the student will gain an understanding of the structure and function of the organs of reproduction.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Distinguish between interstitial cells and seminiferous tubules of the testes.
						Plot the order of anatomical regions encountered by a sperm cell in the male reproductive tract and include the seminal fluid.
						Construct a diagram to demonstrate hormonal integration of male reproductive physiology.
						List the male essential and accessory reproductive organs.
						List the female essential and accessory reproductive organs.
						Rank the events of the menstrual cycle into ten distinct parts.
						Plot the menstrual cycle changes over 28 days; integrate the interactions of gonadotropins, estrogens, and progesterans.

Projects Required: None

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

Compound microscopes.

Human skeletons - articulated and disarticulated of both human bone & plastic.

Prepared microscope slide of normal and pathological human tissues.

Miscellaneous preserved cadaver material.

Miscellaneous vinyl replicas of dissected cadavers (NASCO)

Miscellaneous VHS tapes, 35 mm slides, charts

Computer/CDROM - A.D.A.M., Dynamic Human

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Criterion Based Evaluation:

See Unit Outcomes and Competencies.

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.