

This is a SouthArk Master Syllabus. The course syllabus distributed by the instructor may include additional requirements, must be followed by the student in the given term, and is considered to supersede the Master Syllabus.

Course Number

BIOL 2064/L

Course Title

Human Anatomy and Physiology I /Lab

Course Description

A two-semester study of the structure and functions of the organ systems of the human body and how they work together to maintain homeostasis. Designed for majors in health profession programs. Lab required.

College Mission

South Arkansas Community College promotes excellence in learning, teaching, and service; provides lifelong educational opportunities; and serves as a cultural, intellectual, and economic resource for the community.

College Wide Student Learner Outcomes

Critical Thinking Responsibility Communication

ACTS Course **Program Course**

ACTS Student Learning Outcomes / Course Learner Outcomes

The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of the following areas:

- 1 -General body organization and function
- 2 -Basic biochemistry
- 3 -Cells
- 4 -Metabolism
- 5-Histology
- 6-Integumentary system
- 7-Skeletal system
- 8 -Joints
- 9-Muscular system
- 10 -Nervous system I/ II
- 11-Special senses
- 12 – Proper use of microscope, other lab equipment and lab techniques.

The student will participate in dissections.

Program Outcomes

Course Learner Outcomes

CLO #	Course Learner Outcomes	Unit Outcomes/ Competencies	ACTS	Program	Critical Thinking	Communication	Responsibility	Assessment
CLO 1	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of General Body Organization and Function, Basic biochemistry, Cells, Metabolism.	Ch.1:1-3; Ch.2:1-3; Ch.3:1-3; Ch.4:1-3	1-4		CT4			Exam I
CLO 2	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of Histology, the Integumentary System, and the Skeletal System.	Ch.5:1-3; Ch.6:1-3; Ch.7:1-3	5-7		CT4			Exam II

CLO 3	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of Joints, the Muscular System, Nervous System I.	Ch.8:1-3; Ch.9:1-3; Ch.10:1-3	8-10		CT4			Exam III
CLO 4	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of Nervous System II, Special Senses.	Ch.11:1-3; Ch.12:1-3	10, 11		CT4			Final Exam
CLO 5	The student is to participate in dissections.	Lab	12				R2	Quiz I

Unit Outcomes/ Competencies/ Objectives

Ch 1. - General body organization and function

1. Define all medical terms for body positions and regions. Define the terms 'transverse plane', coronal plane', 'midsagittal plane'.
2. Describe living organisms by characteristics they have and factors needed to maintain living organisms and describe body organization; serous membranes; cavities; compartmentalization in the human body. Describe all organ systems we study in API by main organs and functions. Discuss the relationship between main organs and accessory organs within an organ system.
3. Apply your knowledge of double layered serous membranes of the ventral cavity to triple-layered brain coverings called meninges of the dorsal cavity and compare naming of the various layers. Identify the two longitudinal cuts that result in longitudinal planes of the body. Apply your knowledge of main functions of an organ system to the accessory organs focusing on functions that the main and the accessory organs share.

Ch 2. - Basic biochemistry

1. Define the terms 'chemistry', 'matter', 'elements'; structure of atoms.
Define the term pH - potential for hydrogen in solutions and name body fluids that are basic and those that are acidic.
Define 'diffusion', 'osmosis', and 'filtration'. Define 'phagocytosis', 'endo- and 'exocytosis'.
2. Describe the types of chemical bonds and types of chemical reactions. Discuss the difference between the structure of sugars, fats, proteins, nucleic acids and their different properties when placed into water. Differentiate between molecular and structural formula.
3. Apply what you know about the molecular and structural formula of oxygen to carbon dioxide. Apply what you know about H-bonds between 'H' of one molecule to the 'O' of another molecule to macromolecules like protein and DNA. Apply what you know about sugars and catabolism to the case of 'lactose intolerance'. Apply what you know about passive transport systems to RBC in solutions of different density – describe what happens with RBCs in hyper-, iso, and hypotonic solutions. Apply what you learned in passive transport systems to how the human kidney functions. .

Ch 3. - Cellular structure and function

1. Define the terms 'apoptosis' and 'cancer'. Define 'replication.' Define 'transcription', 'translation'.
2. Describe cell types of the human body and their cell structure and organelles inside cells that allows them to be differentiated by function unlike undifferentiated stem cells where all have same function. Describe passive transport, active transport mechanisms. Describe the stages of the cell cycle and the purpose of mitosis.
3. Apply what you know about spindle formation and centrioles to the stages of mitosis where the nuclear membrane disappears and reappears to evaluate the need for loss and remaking of the nuclear membrane.

Ch 4. Metabolism

1. Define the term 'enzymes'. Describe enzymatic reactions using a diagrammatic representation. List types of chemical reactions. Describe what is meant by cellular respiration. Define the terms 'catabolism', 'anabolism'. Define the term 'cellular respiration'.
2. List and describe the three biochemical pathways of cellular respiration and their function. Describe the role of oxygen in this pathway. Define the term 'oxygen debt'.
3. Apply what you know about the need for the presence of oxygen to bring about complete breakdown of glucose into six carbon dioxides to what you know about 'oxygen debt'. Apply what you know about catabolic enzymes to the case of lactose intolerance.

Ch 5. Histology

1. Define the term 'epithelial membrane' by structure and function. Name the main three epithelial membranes of the human body. Define the term 'epithelial tissue -ET'. Provide examples and their function for all simple squamous, columnar, cuboidal, and transitional ET. Know the major stratified ET. Define the terms 'matrix' and 'connective tissue - CT'.

2. Know that cells come together to form tissues. Describe the cell-to-cell junctions: gap, tight and desmosome junctions. List ET and describe their location, structure, and function. List fibrous, cartilaginous, and fluid CT and describe their location, structure, and function.
3. Apply the definition of the term 'matrix' to fluid Connective Tissues' and provide an example. Apply what you know about connective tissues to a patient with a torn anterior cruciate ligaments who is scheduled for surgery of the torn ligament and explain what connective tissue type needs to be replaced and why that is feasible to be done and can regrow. Explain what in the CT is regrowing.

Ch 6. Integumentary system

1. Define the terms 'integument' and 'cutaneous'. Define the terms 'regeneration' and 'fibrosis' focusing on which of these apply during primary and secondary or more severe burns. Define the term 'UV index' Define the terms 'carcinoma', 'sarcoma'.
2. List the organs of this organ system and their location, structure, and functions. Name the two layers of the cutaneous membrane and describe the layer underneath the skin and what it is called. Describe at least four functions that the upper layer of the skin has. Describe the function of the basal layer. Name the function of the pigment that is located in the melanocytes. Name both functions of the stratified squamous ET of the skin. Name the three CT found in the lower layer of the skin that is made up of a papillary and a reticular portion. Name all other tissues that are found in this layer. Make a list of functions of the lower layer that contribute to controlling body temperature. Name all other functions carried out by this layer that has muscle tissue, nervous tissues and cardiovascular system components.
3. Evaluate the steps of 'wound repair' characterized by upper layer regeneration and lower layer fibrosis with respect to physiological processes by which the two can be differentiated and describe the difference between regeneration of upper layers and fibrosis of lower layers. Knowing that cancers are induced by UV light or chemical compounds entering cells, binding to DNA and inducing mutations that cause cells to become oncogenic and divide without stop, explain why carcinomas and sarcomas are likely to occur in epithelial membranes.

Ch 7. Skeletal system

1. Define the terms 'axial skeleton', 'appendicular skeleton'. Define a variety of bone markings like 'acromion process' and coracoid process ' and others.
2. List the organs of this organ system and their location, structure, and functions. Name the tissue that bone is made up of and how a broken bone can regenerate. Describe the tissue from which ossified bone derives. Describe adult bone structure - name the components of an osteon or the haversian system. Name the structures in bone that allow blood vessels to pass through bone. These blood vessels deliver oxygen and remove carbon dioxide. Name the cells inside the spongy bone region that depend on these blood vessels and those inside the compact bone region. Define the term 'endochondral model' and compare to 'intramembranous model' of bone growth. Name the hormones that control calcium metabolism. List the components of the axial skeleton. Provide names of structures on bone where other bones connect for bones within the cranium, the vertebral column, the thoracic cage. Provide a description of the hyoid bone and its location. List the components of the appendicular skeleton. Provide names of structures on bone where other bones connect for bones within the pectoral girdle of bone and bones within the pelvic girdle of bones; provide names of structures on bones where other bones connect within upper limbs and within lower limbs. Apply your knowledge of axial and appendicular bones to areas on the skeleton where they form joints with each other. Compare knee joint and elbow joint.
3. Apply what you know about axial and appendicular bones and name the ones that form a joint between the axis and the appendicular girdle bones and the bones where the pectoral girdle attaches to the arms and the pelvic girdle attaches to the legs.

Ch 8. Joints

1. Define the term 'joint'. Define joints by structural characteristics: fibrous, cartilaginous, fluid filled. Define joints by levels of movability: synarthrotic, amphiarthrotic, diarthrotic. Provide a meaning for the prefix 'ARTHRO' as used for the term 'arthritis'. Define the term 'arthritis'.
2. List the three main fibrous joints and for each name the two bones form it and whether this type of joint is freely or partially movable or not movable at all. List the two main cartilaginous joints and, for each, name the two bones that form it and whether these joints are freely or partially movable or not movable at all. Name the joint type that starts out cartilaginous joint in childhood but becomes a fibrous joint in later adulthood. For the four main synovial joints - hip and shoulder joints, knee and elbow joints - name the two bones that make up each joint.

List the four structures all synovial joints have. List the extra structures the knee joint has that are missing from the elbow joint. Focus on number of bursae, number of ligaments, support structures like the menisci. Describe what is meant by the term condyloid joint and if that differs from a simple hinge joint like the elbow joint. Characterize synovial joints by type of diarthrotic movement they support: flexion/ extension, abduction/ adduction, etc. Characterize them structurally. Describe, hinge joint, pivot j., condyloid j., plane j., saddle j. and ball-and-socket j. Describe how a ball-and socket joint differs from a hinge joint like the elbow joint.

3. Review and Apply: Review fibrous, cartilaginous, and fluid CT and apply this terminology to the three types of joints in the human body of which the fluid filled joints are by far the most numerous. Joints are classified as a) fibrous joints, b) cartilaginous joints, c) synovial fluid filled joints. Explain what type of fibers one ought to expect in fibrous joints and provide three examples of fibrous joints in the human body.

Ch 9. Muscular system

1. Define terms descriptive of functional groups of skeletal muscles: prime mover/ agonist, antagonist, synergist, fixator. Identify major functional groups of skeletal muscles of the upper arm. Define the terms 'flexion' and 'extension'. Identify the functional groups of skeletal muscles of the upper leg that needed for flexion and extension of the leg involving the knee joint.
2. List the organs of this organ system and their location, structure, and functions. Describe the fine structure of the skeletal and heart muscles versus that of smooth muscles. Then describe the two that are involuntary in action and the one that is voluntary in action. Define the term 'functional syncytium' of heart muscle and 'structural syncytium' of skeletal muscles. List structural organization of skeletal muscle packages. Name the components of a muscle cell. Focus on the reason for the high number of mitochondria in muscle cells. Define the term 'oxygen debt'. List the four main muscle proteins and which one calcium binds to. Describe what happens when one of these proteins is no longer functioning normally. Describe symptoms of MD and the muscle protein that stops working in this disease. Provide at least five examples of how skeletal muscles are named: provide muscle names and location in the body which may require listing points of origin on bones and points of insertion on bones at the other end of the muscle package.
3. Apply what you know about the fixator muscles, gluteus medius and gluteus minimus, to a case scenario where both muscles get damaged and paralyzed and how that might reduce the function of flexors and extensors of the upper leg. Name these groups of muscles that might no longer be able to contract maximally. Define the term 'gluteal gait'.

Ch 10. Nervous system I

1. Define the terms 'central' and 'peripheral'. Define the terms 'afferent nerve' and 'efferent nerve'. Define the terms 'somatic' and 'autonomic'. Define the terms 'sympathetic and para sympathetic'. Define the term 'neurotransmitter'.
2. Describe somatic and autonomic motor nerves and their function. List the organs of this organ system and their location, structure, and functions. List all CNS nerve cell types and PNS nerve cell types. Classify nerve cells by number of cell membrane extensions. Describe a nerve pathway starting with the point of sensation and name the nerve cells along this unidirectional pathway. Explain how a nerve impulse is generated when a specific stimulus causes changes at the sensory receptor. Describe how the nerve cell resting membrane potential is changed from one reading at -70 mV to one that becomes +20-30 mV. Name all phases of such an action potential that propagates down dendrites and axons of nerve cells. Describe events at the neuro-muscular junction starting with the arrival of the nerve impulse at the synapse or presynaptic membrane. Explain why action potentials are called electro-chemical events. Review events at the post-synaptic membrane that can be a muscle sarcolemma or a nerve cell membrane
3. Apply what you know about passive transport across cell membranes to nerve cell membranes. Name factors that might speed up electro-chemical signaling like diffusion of Na and K. Explain why smoking is addictive as nicotine influences an increase in dopamine receptors.

Ch 11. Nervous System II

1. Define the terms 'sulcus', 'fissure', 'gyrus or gyri'. Define the term hemisphere dominance' Define the term 'myelin' and 'white matter'. Define the term 'decussation'. Define the term 'choroid plexus'. Define the term 'plexus'.
2. Review organs of the CNS and PNS, their location and tasks along a unidirectional flow of nerve impulses and differentiate between somatic and autonomic motor neurons. Review the function of sympathetic and parasympathetic motor neurons using the withdrawal reflex arc as an example. Describe, from outside to inside, the layers that protect the brain. Name the four parts of the brain and their general functions. Describe the ventricles and the CSF location and return to the venous blood flow in the dural sinuses. Describe the

meninges and name the fluids between the three membranes. Explain why spinal taps are done after L2 at L3. For the cerebrum, list the 5 lobes, describe the location of the falx cerebri and the falx cerebelli, and the main association areas with interneurons that integrate incoming and outgoing nerve impulses. Name the parts of the diencephalon and the three that form the brain stem. Describe the location of all three endocrine glands inside and on the surface of the brain. Describe all cranial nerves and their function. Describe all mixed function spinal nerves. Discuss descending and ascending nerve tracts. Describe spinal cord structure and the location of the spinal nerves and the meaning of the memory bridge 'AM-PS'.

3. Apply what you know about the meninges to explain why meningitis can also occur along the spinal cord. Describe the importance of the dura mater and when leakage from the subdural space can cause death. Apply what you know about the epidural space to explain where along the spinal cord injections into the blood stream are done. Apply what you know about 'decussation' in the medulla area of the brain that might explain why a right sight frontal lobe aneurism may cause a left side paralysis of facial muscles and arms and legs.

Ch 12. Special senses

1. Define 'iris', 'pupil'. Define the term 'macular degeneration', 'fovea centralis'. Define the term 'optic disk'. Define 'far-sightedness (hyperopia) and near-sightedness (myopia)'. Define the terms 'auricle' 'auditory meatus', 'tympanic membrane', 'ossicles', 'oval and round windows', endolymph, 'cochlea'. Define 'CN II', 'CN VIII'.
2. List the organs of this organ system and their location, structure, and functions. Classify receptors by function into touch / pressure sensory receptors, temperature sensitive receptors, pain receptors, stretch receptors. Describe all special senses - smell, taste, hearing/equilibrium, seeing. Classify them by location in the body. Describe the information flow from the environment to the receptors through the nervous system and where interpretation of the incoming information occurs. List the pathways a sound travels from auricle to hair cell receptors in the inner ear. Describe the auditory nerve pathway. List the pathways a photon/light beam travels from cornea to photoreceptors inside the retina of the eye. Describe the visual nerve pathway. Describe the photoreceptors and differentiate those active during the day from those that active mostly at night.
3. Apply what you know about light or dark adaptation to the identification of the type of muscle that the iris is. Apply what you know about Cranial motor nerves to the extrinsic muscles of the eye. Similarly, identify whether the ciliary muscles that attach to the lens of eye are skeletal or smooth muscles. .

LAB. Describe lab safety steps to be followed at times the student is participating in dissections.

Assessment Description

Three agreed upon SouthArk assessment questions per chapter are added on to the end of each lecture exam and % success is recorded.

Materials and Technological Requirements

The required course material package includes a textbook and the following components:

ISBN 978-0-07-802429-0, HOLE'S HUMAN A&P e-Textbook (2016), SHIER 14/e ..Connect Access Code and Dissection kit to be called in through the SouthArk bookstore.

ISBN 978-1-259-29564-5 Lab Manual for HOLES HUMAN A&P/PIG DISSECTION, MARTIN 14/e

Other Study Aids:

1. Study Aid Package of Lecture handouts and Practice tests available on Blackboard OR www.mhhe.com/shier13
2. Merriam Webster Dictionary online - www.m-w.com/
3. Medline Plus Medical Dictionary online -www.nlm.nih.gov/medlineplus/mplusdictionary.html

Class Attendance Policy

Students are expected to attend all classes in which they are enrolled. If a student is absent from a class session, it is the student's responsibility to make arrangements to complete or make up any work missed. No make-up work for missed classes will be allowed without the approval of the instructor. Students who enroll late must assume all responsibility for work missed. Classes not attended as a result of late enrollment may be counted toward excessive absences. Students not attending the entire class period may be counted absent for that period. An instructor may drop students with a grade of "WE" if students have been absent for an excessive number of days. Warning letters will be sent to the students advising them of the consequences of nonattendance and urging them to contact their instructors immediately. Excessive absences are defined as follows:

Regular Semester

Courses which meet once a week.....	2 absences
Courses that meet twice per week	3 absences
Courses that meet four times per week	5 absences

Summer Session

Courses that meet four times per week in a five week session	3 absences
Courses which meet two evenings per week in a 10 week session	3 absences

Students enrolled in special programs or individualized instruction should contact their program director/instructor regarding specific attendance requirements for the program/course. Some of the selective-admission, health-science programs have specific criteria regarding attendance. Students are encouraged to refer to program policies in these matters.

Jury Duty/Military/Official School Function

Scheduled absences are those that occur due to college-related activities or as a result of summons to jury duty or military duty. Classes missed as a result of scheduled absences will not be counted as excessive absences if the instructor is notified and provided documentation prior to the absence(s). Make-up work for scheduled absences will be at the discretion of the instructor.

In all instances, documentation must be provided to the instructor within 24 hours of receipt. Documentation should come from an appropriate party on letterhead or other official stationery with a signature and contact information. Documentation should list the corresponding dates of the leave.

Medical leave

For medical-related absences, documentation must include written notice from the treating medical professional documenting time needed off related to medical reasons and time student may resume classes. The medical reason does not need to be listed on the documentation; the documentation must include only that there is a medical reason, the amount of time the student needs to be absent, and the time the student should be able to return to classes. Students who elect to work at home while on excused leave must meet with their instructors to make arrangements to do so. Working on coursework while on medical leave is not a requirement but can be requested by students. If students request that they be allowed to work at home while on an excused leave, the instructor will make every reasonable effort to ensure that the student is able to do so.

For students who have a medical condition necessitating time off or accommodation:

- 1) They may work at home on assignments if they choose to if on medical leave approved by a medical professional
- 2) Receive appropriate accommodations related to coursework (i.e., excused from labs with potentially harmful chemicals, have a larger desk, etc.)
- 3) Resume their studies where they left off once they return to classes
- 4) Be allowed to make up any missed work related to medical leave
- 5) Receive incompletes on their transcripts until coursework is completed, according to the incomplete grade contract.
- 6) Be given a reasonable time frame in which to complete missed coursework

Academic Honesty Policy

Students enrolled at South Arkansas Community College are expected at all times to uphold standards of integrity. Students are expected to perform honestly and to work in every way possible to eliminate academic dishonesty. Academic dishonesty includes cheating and plagiarism, which are defined as follows:

- Cheating is an attempt to deceive the instructor in his/her effort to evaluate fairly an academic exercise. Cheating includes copying another student's homework, class work, or required project (in whole or in part) and/or presenting another's work as the student's own. Cheating also includes giving, receiving, offering, and/or soliciting information on a quiz, test, or examination.
- Plagiarism is the copying of any published work such as books, magazines, audiovisual programs, electronic media, and films or copying the theme or manuscript of another student. It is plagiarism when one uses direct quotations without proper credit or when one uses the ideas of another without giving proper credit. When three or more consecutive words are borrowed, the borrowing should be recognized by the use of quotation marks and proper parenthetical and bibliographic notations.

If, upon investigation, the instructor determines that the student is guilty of cheating or plagiarism, the following penalties will apply:

- The student will receive a penalty of no less than a zero on the work in question.

- The instructor will submit a Student Academic Misconduct Form, written report of the incident, to the appropriate dean.
- The dean will submit form to Vice President for Learning to determine disciplinary action.
- The Vice President for Learning will determine whether further disciplinary action will be taken.
- All decisions may be appealed for review through the college's academic appeals procedure.

Equal Opportunity-Affirmative Action Statement

South Arkansas Community College does not discriminate on the basis of age, race, color, creed, gender, religion, marital status, veteran's status, national origin, disability, or sexual orientation in making decisions regarding employment, student admission, or other functions, operations, or activities.

Library Services

Library Homepage: <http://southark.libguides.com/homepage> Library Contact: LibraryStaff@southark.edu or 870.864.7115

Procedures to Accommodate Students with Disabilities:

If you need reasonable accommodations because of a disability, please report this to the Vice President of Student Services with proper documentation. . VPSS Contact: 870.875.7262

The Early Alert System

In an effort to ensure student retention and success, South Arkansas Community College employs an Early Alert System to identify and support at-risk students as soon as possible in a given semester. The intent of Early Alert is to provide this assistance while there is still time to address behaviors or issues that have the potential of preventing students from completing their courses and degree plans. Students referred through the Early Alert System will be required to work on a corrective action plan with their student advising coach and to include attendance accountability and mandatory academic tutoring either in the academic division or in the Testing and Learning Center (TLC).

Once the Student Advising Coach has met with the referred student, and again when the student has met the prescribed corrective actions, the coach will update the Early Alert System so that the instructor is kept informed of the progress in resolving issues.

Behavioral Review Team

At South Arkansas Community College (SouthArk), we are committed to proactive leadership in student wellbeing and campus safety. By focusing on prevention and early intervention with campus situations that involve any person experiencing distress or engaging in harmful or disruptive behaviors, the BRT will serve as the coordinating hub of existing resources to develop intervention and support strategies and offer case management. Students, faculty, staff, and campus guests are encouraged to report any person on campus who is a concern. BRT Contact: 870.875.7262 BRT@southark.edu

Date of Revision: 9/1/2016