

**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 2074/L

**Course Title**

Human Anatomy and Physiology II /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-Endocrine System,
- 2-Blood,
- 3-Cardiovascular System I / II,
- 4-Lymphatic System
- 5-Respiratory System,
- 6-Digestive System,
- 7-Urinary / Excretory System,
- 8-Reproductive System,
- 9-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 Outcomes	Program Outcomes	Critical Thinking	Communication	Responsibility	Assessment
1	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of the Endocrine System, Blood, Cardiovascular System I.	Ch.13-1)-3); Ch.14-1)-3); Ch.15-I -1)-3)	1-3		CT4			Exam I
2	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of Cardiovascular System II, Lymphatic System, and Respiratory System.	Ch. 15-II -1)-3); Ch.16-1)-3); Ch.19-1)-3).	3-5		CT4			Exam II

3	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of the Digestive System, Nutrition and Metabolism, Urinary System.	Ch.17-1)-3); Ch.18- 1)-3); Ch.20-1)-3).	6, 7		CT4			Exam III
4	The student will explain, describe, discuss, recognize, and/or apply knowledge and understanding of the Reproductive System, Growth and Development, Endocrine System.	Ch.22-1)-3); Ch.23-1)-3). Ch. 13	8, 1		CT4			Final Exam
5	The student is to participate in dissections.	Lab- Describe lab safety steps to be followed at times the student is participating in dissections.	9				R 2	Quiz I

### Unit Outcomes/ Competencies/ Objectives

#### Ch 13. - Endocrine System –

**1) Define** the terms 'endocrine', 'paracrine', and 'exocrine' secretions. Define the terms of exocrine secretion: 'eccrine', 'apocrine', and 'holocrine'. Define the terms 'hyperglycemia' and 'hypoglycemia' and which of the two terms applies in cases of diabetes type II.

**2) List** the organs of the endocrine system and their function. Remember in detail the location, structure and function of the thyroid, pancreas, and adrenal glands.

**Describe** mechanisms of action of protein hormones like insulin and steroid hormones like testosterone/ estrogen and what is meant by negative feedback.

**3) Apply** what you know about merocrine secretions to the pancreas, an endocrine organ that secretes hormones into the blood stream, but also secretes enzymes into a duct that leads to the outside world. Analyze how hypothalamus and pituitary gland are shut down once there is no more hormone needed. Evaluate what happens once blood glucose levels increase and compare this to when blood glucose levels drop with respect to making insulin and release of insulin from the pancreas.

#### Ch. 14 - Blood -

**1) Define** the terms 'antigen' and 'antibody'. Define the terms 'coagulation' and 'agglutination' and explain which of these terms correlates with the process of antibody-antigen-complex formation. Define the term 'antigen D'. **2) Remember** what type of Connective Tissue blood is. Blood is a CT – connective tissue with a fluid matrix made up of which components; what is meant by hematocrit value of blood; name all the blood cells, name all the protein types and other components of plasma; describe antibodies and antigens. Describe function of RBCs; binding O<sub>2</sub>; erythropoiesis; cycling of iron inside the protein hemoglobin that is inside RBCs that die every 120 days. Describe functions of WBCs; diapedesis, immune functions that granulocytes have and those that agranulocytes have. Describe function of thrombocytes – extrinsic clotting mechanism; intrinsic clotting mechanism; role of Ca and Vitamin K. Discuss Rhesus factor antigen = antigen D. **3) Evaluate** what happens when a rhesus negative mother is pregnant with a rhesus-positive fetus at time of birth of this baby. Analyze whether erythroblastosis in the second rhesus positive fetus happens because of what was formed in the mother at the time of first birth.

#### Ch. 15-I - Cardiovascular System I –

**1) Define** the term 'mediastinum'. Define the term 'syncytium'. Define the terms 'endo-', 'myo-', 'epicardium'. Define the term 'visceral pericardium' and 'parietal pericardium'. Define the term 'fibrous pericardium'. Define the term 'pericarditis'. Define the term 'electro-cardiogram'. Define the term 'Einthoven triangle'. Define the terms 'bradycardia', 'tachycardia', 'angina pectoris', 'MI' and 'mitral valve prolapse'.

**2) List** the organs of this organ system. **Review and describe** in detail the location, structure and function of the heart and methods to determine normal function. Describe all main blood circuits.

**3) Evaluate** the steps that lead toward MI – myocardial infarction. Discuss the likely reason for the development of CHF-congestive heart failure.

#### Ch 15-II - Cardiovascular System II –

**1) Define** the term 'naturally occurring anastomosis' and provide an example. Define the term 'coronary bypass operation' and describe which veins can be used without loss of circulation in the body to replace plugged up coronary arteries.

**2) Describe** structure of arteries versus veins and function of stress hormone in vasoconstriction versus vasodilation. Describe the location to measure the arterial pulse rate and the preferred venipuncture site, and sites to place a

stethoscope to listen to AV and SL valve sounds as they open and close. Review the use of the EKG to determine normality of the cardiac cycle. Discuss factors that increase HR or SV that are used to determine CO. Review 'systemic circulations'. Describe the following special pathways and their function: Circle of Willis, arterial anastomosis.

Venous hepatic portal system used to filter out nutrients

Venous anastomosis in leg versus venous anastomosis in the arm. Know all major blood vessel names.

**3) Evaluate** what would happen to blood and blood flow if there were no hepatic portal rerouting system.

### **Ch 16 - Lymphatic System -**

**1) Define** the terms 'antigen' and 'antibody'. Define the terms 'specific immune defenses' and 'nonspecific immune defenses'. Define the term 'naturally acquired active immunity', 'naturally acquired passive immunity', 'artificially acquired active immunity', 'artificially acquired passive immunity'.

**2) List** the organs of this organ system and describe their location, structure, and function. **Describe** structure and function of lymph vessels and compare to arteries versus veins; understand how lymph is generated and returned to blood; learn the pathways that allow transport of lymph back to the subclavian vein; learn to differentiate lymphatic ducts and trunks and the difference between the R lymphatic duct and the L lymphatic duct joining the thoracic duct. Provide an example of cell-cell-mediated immunity that precedes the making of antibodies by B-lymphocytes. Name the lymphocyte that is the main WBC involved in humoral/ antibody mediated immunity. Describe the immune process that follows a person's vaccination. Explain what is meant by artificially acquired active immunity.

**3) After** summarizing the animation on how HIV virus invades the human body and the WBCs that are invaded, **apply** what you know about 'key - and lock relationships' to the interaction between the AIDS virus and macrophages and T-lymphocytes.

**Analyze** what is different between artificially and naturally induced immunity.

### **Ch 19 - Respiratory system**

**1) Define** the term 'alveolus'. Define the term 'ventilation'. Define the term 'spirometry'. Define the term 'vital capacity'.

**2) Name** the organs of the respiratory system: upper and lower respiratory system, and describe their location, structure and their function. Learn about the four main function of the respiratory system.

Describe the laws that govern inhalation and exhalation: Boyle's law; Dalton's law. Name a physical parameter that influences binding of O<sub>2</sub> to the iron in heme that is part of hemoglobin.

Describe the location and function of the internal and external intercostal muscles and the diaphragm.

**3) Apply** what you know about 'IRV', 'ERV', and 'tidal volume' to help determine a person's vital capacity. Explain why the dead volume needs to be subtracted when determining the rate of ventilation in the alveoli of the lung.

### **Ch. 17 - Digestive System.**

**1) Define** the terms 'emulsification', 'absorption', and 'assimilation' and describe where in the body they apply. Define the terms 'apical side' and 'basal side' of a columnar absorptive cell. Define the terms 'lacteal', 'chylomicron'.

**2) List** the organs of this organ system and describe their location, structure, and functions. **Differentiate** between the organs of the digestive system: upper and lower digestive system. Describe the lining of the GI tract. Describe the peritoneum.

Name the five main functions of the digestive system [see lecture.ppt file] and describe each in detail.

Prior to absorption, chemical digestion has to occur so that the nutrients/molecules are small enough to fit across the simple columnar ET. Name the enzyme in gastric juice and what it digests. Name all pancreatic juice enzymes and what they digest. Write the reaction for breakdown of triglycerides by lipase. Name the enzyme in saliva that breaks down starch/amylose. Explain whether digestion is an anabolic or catabolic process. Name the intestinal wall enzymes that digest maltose, lactose, sucrose.

For the process of absorption, explain why a 'villus' is well designed. Absorption occurs through the apical side of absorptive cells in the lining of the GI tract. Explain the difference between 'villus' and 'microvillus'. Name the blood vessel that carries nutrients from the digestive tract to the liver.

Provide a list of three hormones required to initiate digestive juice release.

**3) Apply** what you know about epithelial membranes that are made up of two tissues, an ET and a CT. Name the double layered epithelial membrane that protects the abdominal digestive system organs. An inflammation of this membrane is known by what medical term. Remember that an inflammation of the pericardium is known as 'pericarditis' just as an inflammation of the meninges is known as 'meningitis'.

### **Ch 18 - Nutrition and Metabolism.**

**2) Define** the terms 'nutrition' and 'diet', 'vitamins' and 'minerals'. Define the term 'electrolyte'. Define the terms 'metabolism', 'BMR' and 'BMI'. Define the terms 'T3 and T4', 'ghrelin' and 'leptin'.

**2) Describe** macronutrients: list the steps of breakdown of starch, a carbohydrate, and what happens to the ultimate breakdown product glucose. Do the same for triglycerides and describe what happens to the fatty acids. Describe protein breakdown into smaller units and provide the name of these smaller units that are absorbed into the blood stream. Provide sources of these macronutrients. Name a source for carbohydrates, particularly disaccharides and

polysaccharides. Name foods rich in proteins. Name foods rich in saturated fats and cholesterol. Explain the difference between the hormones leptin and ghrelin. Describe how BMR affects a person's body weight. Name the two thyroid hormones that control BMR. Name the two hormones that regulate the rate of metabolism. Explain what BMI stands for and what BMI values tell us about a person's nutrition status - whether it may indicate overnutrition [positive energy balance], normal level of nutrition, or undernutrition [negative energy balance].

Describe micronutrients. Differentiate between vitamins and minerals. List the fat-soluble vitamins and their main functions in our body. List the water soluble vitamins and their function. Name all major minerals that form the basis of blood which is an electrolytic solution. Provide examples of deficiencies in our body due to lack of specific mineral elements. Name the trace elements and their function. Focus on iodine, iron, zinc, fluorine.

**3) Apply** what you know about 'hyperthyroidism' and its effect on the rate of metabolism and body weight. Describe what happens when the BMR increases. Name factors that may cause BMR to decrease causing obesity.

#### **Ch 20. Urinary System.**

**1) Define** the term 'retroperitoneal'. Define 'glomerulonephritis'. Define the term 'counter current multiplier system'. Define the term 'diuresis'. Define the terms 'renin', 'aldosterone', 'ADH', and 'erythropoietin'.

**2) Name** the organs of the urinary system and describe their location, structure and functions. Explain the term 'retroperitoneal'. List the main blood vessels of the systemic circuit into and out of the kidneys and from there back to the RA of the heart. Describe the components of the kidney. Describe the smallest functional unit of the kidney: the nephron. Name the main four structures of a nephron and the four functions leading to urine concentration inside the kidneys. Describe the principle of passive transport that aids in concentrating what was filtered out. Explain how the cortex of the kidney can be less concentrated compared to the medulla region that becomes highly concentrated. Describe under what conditions the kidney's juxta-glomerular-apparatus causes the secretion of erythropoietin and its function.

Describe under what conditions the kidney secretes the hormone renin and its function. Explain the function of aldosterone and ADH and how these two hormones cause an increase in BP.

Explain the significance of having a transitional ET lining the bladder and why epithelial cells may appear flat rather than round prior to micturition. Describe the process of micturition and the two sphincter muscles responsible for control of micturition and their location.

**3) Apply** what you know about filtration, a passive transport mechanism, to explain why blood pressure needs to be high to get waste removed from blood. Explain what happens to a patient if, then, renin is not secreted.

At times of metabolic acidosis, evaluate why blood pH may increase again once body fluids are filtered and pass through the DCT of the nephron.

#### **Ch 22 - Reproductive System.**

**1) Define** the terms 'gonad', 'meiosis', 'endometrium, myometrium, perimetrium'. Define the term 'Graafian follicle'. Define the term 'corpus luteum'. Define the terms 'lochia' and 'colostrum' and 'puerperium'.

**2) List** the organs of this organ system and describe their location, structure, and functions. Explain the advantage of meiosis. List the main functions of the reproductive system. Compare spermatogenesis and oogenesis.

Discuss the control of the steroid hormone pathways in the male and the female body. Name the functions of GnRH -- FS, LH/ ICSH --- Testosterone; name the functions of GnRH --- FS, LH --- Estrogen. Discuss the menstruation cycle: FSH-E - LH - P.

List all secondary sex characteristics induced by testosterone/ by estrogen.

Explain by what mechanism the uterine lining is not lost during the onset of pregnancy.

Describe where progesterone is made after ovulation and where progesterone is made after the fertilized egg embeds into the uterine lining. Describe what can be reinduced once the progesterone/ estrogen levels drop when the placenta is gone at the end of the birthing process.

Explain the purpose of HcG after fertilization of the egg and its effect on keeping the corpus luteum from degenerating. Describe the function of oxytocin, its effect on the myometrium during the birth process.

**3) Evaluate** why regulation of oxytocin levels during the birthing process is an example of positive feedback.

#### **Ch 23 - Growth and Development.**

**1) Define** the terms 'growth' and 'development'. Define the terms 'gastrulation', 'ICM', 'germ layer'. Define the terms 'chorionic villi' and 'decidua basalis'. Review definitions for 'puerperium', 'lochia', 'colostrum,' and define the term 'meconium'. Define the terms 'ductus venosus - ligamentum venosum', 'ductus arteriosus - ligamentum arteriosum', 'foramen ovale - fossa ovalis'.

**2) Describe** the cellular function that allows an organism to grow (describe mitosis). Describe how cells develop by induction of specific developmental genes at specific time points of development that generates specialized cells different from the initial mother cell. These new cells are then able to meet stage-specific needs as the organism ages. Name the two growth phases of pregnancy and the phase where developmental processes predominate. Provide the medical term for this developmental phase during week two to week eight of pregnancy.

Describe the cleavage phase and when the embryo becomes a hollow ball just prior to embedding itself into the

uterine lining. Define the terms 'trophoblast' and 'ICM - inner cell mass'. Describe the generation of the four extra-embryonic membranes from the trophoblast.

Describe the gastrulation phase and the development of the germ layers from the ICM. Name time points when significant events happen.

Describe the structure of the placenta. Explain which hormone levels drastically drop, when the placenta is lost at time of birth and how this influences the new onset of the menstruation cycle.

Describe the fetal phase and significant time points during this phase. Discuss fetal circulation

**3) Apply** what you know about the difference between growth and development to the postnatal period knowing that during pregnancy only the first two weeks and the third to ninth month are considered true growth phases. Suggest a postnatal phase that is predominantly characterized by growth only.

**Evaluate** why a newborn might turn blue when the fossa ovalis does not naturally form.

**Apply** what you know about the formation and structure of the placenta that might explain why fetal RBCs cannot cross into the mother's blood stream prior to birth.

### **Ch. 13 Review. Endocrine System.**

**1) Define** the term 'negative feedback.'

**2) Provide** an example for 'negative feedback' and for 'positive feedback'. **Describe** how reproductive hormones are induced in males and in females and the location of the glands that control the testes in males and the ovaries in females. Differentiate the mechanism of action of steroid hormones like testosterone from that of protein hormones like insulin. Review the location of the hypothalamus, pituitary glands and the testis and ovaries and describe control of steroid hormone secretion.

**3) Apply** what you know about negative feedback to how testosterone and estrogen shut down the organs that make them. .

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

### **Assessment Description(s)**

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](http://www.mhhe.com/shier13)
2. Merriam Webster Dictionary online - [www.m-w.com/](http://www.m-w.com/)
3. Medline Plus Medical Dictionary online -[www.nlm.nih.gov/medlineplus/mplusdictionary.html](http://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 written report of the incident to the Vice President for Learning
- 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: 8/25/2016**