

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: BIOL 258

Course Title: Human Anatomy and Physiology Laboratory

KRSN: BIO2020-Anatomy & Physiology  
(Kansas Regents Shared Number)

Please visit the Kansas Board of Regents website for more information.

Division:  Applied Science (AS)     Liberal Arts (LA)     Workforce Development (WD)  
 Health Care (HC)     Lifetime Learning (LL)     Nursing     Developmental

Credit Hour(s): 2

Effective Date: Summer 2017

Assessment Goal Per Outcome: 70%

**COURSE DESCRIPTION**

The course is an integrated study of the function, structure and interrelationships of the various organs and systems of the human body. Considerable emphasis is placed on dissection. Coursework is designed to meet the diversified needs of those interested in health sciences as well as physical education and biological science majors.

**MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES**

It is strongly recommended that all learners complete either BIOL 111/112 General Biology and Lab or BIOL 251/252 Biology I and lab prior to enrolling in this course.

Concurrent enrollment in BIOL 257 (Anatomy and Physiology).

**TEXTS**

The official list of textbooks and materials for this course is found on *myNeosho*.

<http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx>

## GENERAL EDUCATION OUTCOMES

1. Practice Responsible Citizenship through:
  - identifying rights and responsibilities of citizenship,
  - identifying how human values and perceptions affect and are affected by social diversity,
  - identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
  - listing factors associated with a healthy lifestyle and lifetime fitness,
  - identifying the importance of lifetime learning,
  - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
3. Communicate effectively through:
  - developing effective written communication skills,
  - developing effective oral communication and listening skills.
4. Think analytically through:
  - utilizing quantitative information in problem solving,
  - utilizing the principles of systematic inquiry,
  - utilizing various information resources including technology for research and data collection.

## COURSE OUTCOMES/COMPETENCIES (as Required)

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

All students will be assessed upon their performance regarding the following outcomes. At NCCC, students will be assessed during a lecture and a separate laboratory section. Those outcomes/competencies that will be assessed in the laboratory section are marked with an \*.

The modules may be covered in a different sequence from that which is listed here. Content topics need not be taught in single blocks, but may be integrated. Unifying themes, such as homeostasis, are emphasized throughout.

### Body Plan & Organization

1. Upon completion of this section the student will be able to demonstrate measurable understanding of descriptive anatomical and directional terminology including the following topics. \*

- anatomical position
- body planes, sections
- body cavities & regions
- directional terms
- basic terminology
- levels of organization
- survey of body systems

## **Homeostasis**

2. Upon completion of this section the student will be able to demonstrate measureable understanding of the basic concept of homeostasis and how homeostatic mechanisms apply to body systems including the following topics.

- general types of homeostatic mechanisms
- examples of homeostatic mechanisms
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

## **Chemistry & Cell Biology Review**

3. Upon completion of this section the student will be able to demonstrate measureable understanding of basic chemistry and cellular structures and function, including the following topics.

- atoms & molecules
- chemical bonding
- inorganic compounds/solutions (including the concept of pH)
- organic compounds
- energy transfer using ATP
- intracellular organization of nucleus and cytoplasm
- membrane structure & function
- mechanisms for movement of materials across cellular membranes
- organelles
- protein synthesis
- cellular respiration (introduction)
- somatic cell division (mitosis & cytokinesis)
- reproductive cell division
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states and disorders

Note: The intent of the pre-requisites given earlier is to minimize the amount of time spent on the above section.

## **Histology**

4. Upon completion of this section the student will be able to demonstrate measureable understanding of the basic tissues of the body, their location and functions, including the following topics.

- overview of histology & tissue types
- microscopic anatomy, location, & functional roles of epithelial, connective, muscular and nervous tissues\*
- membranes (mucous, serous, cutaneous & synovial)
- glands (exocrine & endocrine)
- tissue injury & repair

## **Integumentary System**

5. Upon completion of this section the student will be able to demonstrate measureable understanding of major gross and microscopic anatomical components of the

integumentary system and describe the functions of the system, including the following topics.

- general functions of the skin & the subcutaneous layer
- gross & microscopic anatomy of the skin \*
- roles of the specific tissue layers of the skin & subcutaneous layer
- anatomy & functional roles of accessory structures
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Skeletal System**

6. Upon completion of this section the student will be able to demonstrate measureable understanding of major gross and microscopic anatomical components of the skeletal system and explain their functional roles in osteogenesis, repair, and body movement, including the following topics.

- general functions of bone & the skeletal system
- structural components – microscopic anatomy\*
- structural components – gross anatomy \*
- physiology of embryonic bone formation (ossification, osteogenesis)
- physiology of bone growth, repair & remodeling
- organization of the skeletal system\*
- gross anatomy of bones \*
- classification, structure & function of joints (articulations)
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Muscular System**

7. Upon completion of this section the student will be able to demonstrate measureable understanding of major gross and microscopic anatomical components of the muscular system and explain their functional roles in body movement, maintenance of posture, and heat production, including the following topics.

- general functions of muscle tissue
- identification, general location, & comparative characteristics of skeletal, smooth, & cardiac muscle tissue \*
- detailed gross & microscopic anatomy of skeletal muscle \*
- physiology of skeletal muscle contraction
- skeletal muscle metabolism
- principles & types of whole muscle contraction
- nomenclature of skeletal muscles \*
- location & function of skeletal muscles \*
- group actions of skeletal muscles
- lever systems
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

## **Nervous System**

8. Upon completion of this section the student will be able to demonstrate measureable understanding of the major gross and microscopic anatomical components of the nervous system and explain their functional roles in communication, control, and integration, including the following topics.

- general functions of the nervous system
- organization of the nervous system from both anatomical & functional perspectives\*
- gross & microscopic anatomy of the nerve tissue\*
- neurophysiology, including mechanism of resting membrane potential, production of action potentials, & impulse transmission
- neurotransmitters & their roles in synaptic transmission
- sensory receptors & their roles
- division, origin, & function of component parts of the brain\*
- protective roles of the cranial bones, meninges, & cerebrospinal fluid
- structure & function of cranial nerves\*
- anatomy of the spinal cord & spinal nerves\*
- reflexes & their roles in nervous system function
- physiology of sensory & motor pathways in the brain & spinal cord
- functions of the autonomic nervous system
- comparison of somatic & autonomic nervous systems
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

## **Special Senses**

9. Upon completion of this section the student will be able to demonstrate measureable understanding of the major gross and microscopic anatomical components of the eye and ear and explain their functional roles in vision, hearing and equilibrium. Students should also be able to identify and locate the receptors responsible for olfaction and gustation and briefly describe the physiology of smell and taste, including the following topics.

- gross & microscopic anatomy of the eye & ear\*
- roles of specific tissues of the eye in vision
- roles of specific tissues of the ear in hearing & equilibrium
- olfactory receptors & their role in smell
- gustatory receptors & their role in taste
- general gross & microscopic anatomy of hearing & accessory structures of the ear \*
- roles of specific tissues of the ear in hearing
- roles of the accessory structures
- role of the ear in equilibrium
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

## **Endocrine System**

10. Upon completion of this section the student will be able to demonstrate measureable understanding of the major gross and microscopic anatomical components of the

endocrine system and explain the functional roles of their respective hormones in communication, control, and integration, including the following topics.

- general functions of the endocrine system
- chemical classification of hormones & mechanism of hormone actions at receptors
- control of hormone secretion
- control by the hypothalamus & pituitary gland
- identity, source, secretory control, & functional roles of the major hormones produced by the body
- local hormones (paracrines & autocrines) & growth factors
- hormonal response to stress
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

Note: Since the endocrine system plays a key role in the regulation and integration of body organ systems, detailed aspects of endocrine system function may be emphasized throughout the course.

### **Cardiovascular System**

11. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the cardiovascular system and explain their functional roles in transport and hemodynamics, including the following topics.

- general functions of the cardiovascular system
- composition of blood plasma
- identity, microscopic anatomy, numbers, formation, & functional roles of the formed elements of the blood \*
- hemostasis, including coagulation of the blood
- ABO & Rh blood grouping
- gross & microscopic anatomy of the heart, including the conduction system \*
- physiology of cardiac muscle contraction
- blood flow through the heart
- conduction system of the heart & the electrocardiogram
- cardiac cycle
- regulation of cardiac output, stroke volume & heart rate
- anatomy & functional roles of the different types of blood vessels \*
- pattern of blood circulation throughout the body, including systemic, pulmonary, coronary, hepatic portal, & fetal circulations
- blood pressure & its functional interrelationships with cardiac output, peripheral resistance, & hemodynamics
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Lymphatic System & Immunity**

12. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the

lymphatic system and explain their functional roles in fluid dynamics and immunity, including the following topics.

- general functions of the lymphatic system
- general functions of the lymphatic system
- lymph & lymphatic vessels
- lymphatic cells, tissues, & organs \*
- introduction to innate (nonspecific) defenses & adaptive (specific) defenses
- innate (nonspecific) defenses
- overview of adaptive (specific) defenses
- antigens & antigen processing
- lymphocytes & their role in adaptive immunity
- antibodies & their role in adaptive immunity
- applied immunology
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Respiratory System**

13. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the respiratory system and explain their functional roles in breathing/ventilation and in the processes of external and internal respiration, including the following topics.

- general functions of the respiratory system
- gross & microscopic anatomy of the respiratory tract & related organs\*
- mechanisms of pulmonary ventilation
- pulmonary air volumes & capacities
- mechanisms of gas exchange in lungs & tissues
- mechanisms of gas transport in the blood
- control of pulmonary ventilation
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Digestive System**

14. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the digestive system and explain their functional roles in digestion, absorption, excretion and elimination, including the following topics.

- general functions of the digestive system
- gross & microscopic anatomy of the alimentary canal \*
- gross & microscopic anatomy of the accessory glands & organs \*
- peritoneum & mesenteries
- motility in the alimentary canal
- mechanical & chemical processes of digestion
- processes of absorption
- hormonal & neural regulation of digestive processes
- application of homeostatic mechanisms

- predictions related to homeostatic imbalance, including disease states & disorders

### **Metabolism**

15. Upon completion of this section the student will be able to demonstrate measurable understanding of the functional relationship among cellular, tissue and organ level metabolism, the role nutrition plays in metabolism, and the mechanisms by which metabolic rate is regulated in the body, including the following topics.

- nutrition
- introduction to metabolism
- cellular respiration & the catabolism & anabolism of carbohydrates, lipids, & proteins
- metabolic roles of body organs
- energy balance & thermoregulation
- application of homeostatic mechanisms
- predictions related to homeostatic imbalance, including disease states & disorders

### **Urinary System**

16. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the urinary system and explain their functional roles, including the following topics.

- general functions of the urinary system
- gross & microscopic anatomy of the urinary tract, including detailed histology of the nephron\*
- functional processes of urine formation, including filtration, reabsorption, secretion, & excretion
- factors regulating & altering urine volume & composition, including the renin-angiotensin system and the roles of aldosterone & antidiuretic hormone
- endocrine activities of the kidneys, such as vitamin D activation & secretion of erythropoietin
- innervation & control of the urinary bladder

### **Fluid/Electrolyte & Acid/Base Balance**

17. Upon completion of this section the student will be able to demonstrate measurable understanding of the physiology of the homeostatic mechanisms that control fluid/electrolyte and acid/base balance, including the following topics.

- regulation of water intake & output
- description of the major fluid compartments, including intracellular, extracellular, intravascular, & interstitial
- volume & chemical composition of major compartment fluids
- movements between the major fluid compartments, causal forces, volumes, & electrolyte balance
- buffer systems & their roles in acid/base balance
- role of the respiratory system in acid/base balance
- role of the urinary system in acid/base balance



## **Reproductive Systems**

18. Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the reproductive system and explain their functional roles in reproduction and inheritance, including the following topics.

- general functions of the male & female reproductive systems
- gross & microscopic anatomy of the male & female reproductive systems \*
- gametogenesis
- specific roles of the female reproductive organs
- specific roles of the female reproductive organs
- regulation of reproductive functions
- conception, pregnancy, & embryological & fetal development parturition & labor
- mammary gland anatomy & physiology

Comments:

It should be noted that the topics for this course may be covered in a different sequence from that which is listed here. In addition, topics may be covered in subsequent courses, as long as all topics are discussed. There may be some transferability questions if all course sequences are not taken at the same institution. If course requirements are met at the same institution, then expectations of successfully meeting the defined competencies are satisfied.

## **MINIMUM COURSE CONTENT**

The majority of the course content is reflected in the outcomes and competencies listed above. For this laboratory section, there is emphasis on dissection. The following specimens will be used for dissection and learning purposes:

- Sheep Brain
- Cow Eye
- Sheep Heart
- Mammal (species may vary depending on supplies)

## **STUDENT REQUIREMENTS AND METHOD OF EVALUATION**

Grading Scale

100-90% - A

89-80% - B

79-70% - C

69-60% - D

59% or less - F

## **ASSESSMENT OF STUDENT GAIN**

The purpose of assessing student learning at Neosho County Community College is to ensure the educational purposes of the institution are met and appropriate changes are made in program development and classroom instruction to allow for student success. The instructor(s) of this course will determine the methods of assessment most appropriate and complete an assessment report at the end of the course.

## **ATTENDANCE POLICY**

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.
2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified. Please refer to the Student Handbook/Academic Policies for more information
3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

## **ACADEMIC INTEGRITY**

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

## **ELECTRONIC DEVICE POLICY**

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

## **NOTE**

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

## **ACCOMMODATIONS**

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

## **NON-DISCRIMINATION POLICY**

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

<http://www.neosho.edu/Departments/NonDiscrimination.aspx>

## **SEXUAL MISCONDUCT POLICY (TITLE IX)**

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms. All instructors are considered mandatory reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

<http://www.neosho.edu/TitleIX.aspx>

## **COURSE NOTES**

This course examines and discusses sexuality and human reproductive biology in a mature context. If you find such discussions, models, illustrations, etc., of the human reproductive system offensive you should not enroll in this course.

Following NCCC policy, children may not attend this class.

If you have any ethical concerns regarding the educational use of preserved specimens, please feel free to talk to the instructor about such issues. All preserved specimens are processed through licensed humane societies or authorized institutions.

To the extent possible, the student should attempt to spend time in the lab outside of scheduled class times. The instructor will arrange these times with the student. Such effort has a profound impact on grades.

Review the Material Safety Data Sheet for summary of safety issues related to preservatives used in laboratory specimens.