

Washtenaw Community College Comprehensive Report

BIO 111 Anatomy and Physiology - Normal Structure and Function Effective Term: Winter 2022

Course Cover

College: Math, Science and Engineering Tech

Division: Math, Science and Engineering Tech

Department: Life Sciences

Discipline: Biology

Course Number: 111

Org Number: 12110

Full Course Title: Anatomy and Physiology - Normal Structure and Function

Transcript Title: Anat/Phys - Norm Struct & Func

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Consultation with all departments affected by this course is required.

Rationale: No major changes for syllabus review.

Proposed Start Semester: Fall 2021

Course Description: In this course students will be given an intensive, in-depth introduction to the structure and function of all the body systems. Course topics include the following systems: integumentary, skeletal, muscular, nervous, cardiovascular, immune, respiratory, urinary, digestive and reproductive. Emphasis is on basic physiological principles, interrelationships among systems, homeostatic mechanisms and introductory disease processes. The laboratory component provides a unique hands-on learning experience for exploration of human body systems with the use of prosected cadavers. In addition, students complete lab exercises to enhance their understanding of basic physiology.

Course Credit Hours

Variable hours: No

Credits: 5

Lecture Hours: Instructor: 60 **Student:** 60

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 105 **Student:** 105

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite

high school chemistry

or

Prerequisite

CEM 101 minimum grade "C"

and

Prerequisite

high school biology

or

Prerequisite

BIO 101 minimum grade "C"

or

Prerequisite

BIO 102 minimum grade "C"

or

Prerequisite

BIO 161 minimum grade "C"

or

Prerequisite

BIO 162 minimum grade "C"

General Education**MACRAO**

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Michigan Transfer Agreement - MTA

MTA Lab Science

Request Course Transfer**Proposed For:****Student Learning Outcomes**

1. Apply correct terminology when referring to the structure and function of the human body at all levels, including biochemical, molecular, cellular, histological and organismal.

Assessment 1

Assessment Tool: Outcome-related multiple-choice questions on cumulative final exam

Assessment Date: Fall 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key and item analysis

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

2. Recognize the importance of homeostasis, and how it depends on events, including gene expression, that occur at the chemical and cellular level.

Assessment 1

Assessment Tool: Outcome-related multiple-choice questions on cumulative final exam

Assessment Date: Fall 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key and item analysis

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

3. Identify the structural organization of the human body, including types of cells, tissues, body cavities and organs.

Assessment 1

Assessment Tool: Outcome-related multiple-choice questions on cumulative final exam

Assessment Date: Fall 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key and item analysis

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

4. Identify the major organ systems, their structures, and how those structures function to maintain homeostasis.

Assessment 1

Assessment Tool: Outcome-related multiple-choice questions on cumulative final exam

Assessment Date: Fall 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key and item analysis

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.

Who will score and analyze the data: Departmental faculty

5. Demonstrate proficiency in lab-based skills.

Assessment 1

Assessment Tool: Lab worksheets

Assessment Date: Fall 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 75% or higher.

Who will score and analyze the data: Departmental faculty will score and analyze the data.

Course Objectives

1. Distinguish between electrons, protons, neutrons, atoms, elements, molecules and compounds.
2. Use and interpret anatomical terminology, including directional terms and regional terms.
3. Distinguish between genes and proteins.
4. Define ions and polar molecules and identify how they are different.
5. Define extracellular and intracellular and be able to identify the fluid compartments that each consists of.
6. Define "internal environment" and identify the body fluid compartments that comprise it.

7. Define homeostasis and identify examples.
8. Identify the components of a negative feedback control system.
9. Identify systems in the body and explain their contribution to homeostasis.
10. Identify factors that determine water solubility and lipid solubility.
11. Identify the properties of specific carbohydrates, proteins, nucleic acids and lipids that are important to their function.
12. Identify the ways that specific carbohydrates, proteins, nucleic acids and lipids function in the human body.
13. Identify the connection between gene expression and cellular differentiation.
14. Use the pH scale to identify the acidity or alkalinity of a solution.
15. Predict whether diffusion of a substance will occur across a cell membrane and identify the factors involved.
16. Distinguish between simple diffusion, facilitated diffusion and active transport, and identify examples in the body.
17. Define osmosis and osmotic pressure.
18. Correctly use the terms hypertonic, hypotonic and isotonic.
19. Identify the structures of a cell, including the membrane, nucleus, cytosol and cytoplasmic organelles, and their contributions to cell functions, including metabolism, membrane transport and cell division.
20. Identify the molecules and process involved in cellular metabolism.
21. Describe signal transduction and identify the molecules involved.
22. Define the anatomical position and the sectional planes that can be applied to it.
23. Identify the various body cavities and their associated membranes.
24. Identify the organs in the respective body cavities, the systems that they are part of and the contribution of those systems to homeostasis.
25. Identify and define the four main tissue types, their subgroups and their special structures.
26. Identify structures, functions and mechanisms of the integumentary system and their contributions to homeostasis - distinguish between the four types of membranes: serous, mucous, synovial and cutaneous - identify the accessory structures of the skin and their function - distinguish between hypothermia, hyperthermia and fever.
27. Identify structures, function and mechanisms of the skeletal system and their contributions to homeostasis - distinguish between bone as a cell, as a tissue and as an organ - distinguish between axial and appendicular skeletons and identify all of their bones - identify the bone markings found in the lab exercise by description, by appearance on the surface, and by palpation.
28. Identify structures, functions and mechanisms of the nervous system and their contributions to homeostasis - identify the structural levels of skeletal muscle and how those structures work to cause muscle contraction - identify how the nervous system controls skeletal muscle contraction - define the terms agonist, antagonist and synergist and the specific movements that result - define the terms origin and insertion and identify specific origins and insertions.
29. Identify structures functions and mechanisms of the endocrine system and their contributions to homeostasis - identify different parts of the brain, brainstem and spinal cord and their functions - explain the electrical and chemical aspects of how neurons work - identify the structure and function of the various sensory receptors - identify specific nerve plexuses - identify specific innervations and their clinical implications for both motor and sensory function - identify specific spinal nerves and specific cranial nerves.
30. Identify structures, functions and mechanisms of the endocrine system and their contributions to homeostasis - identify the different mechanisms of hormone action on target cells - explain the different mechanisms of control of hormone secretion and their importance in maintaining plasma hormone levels - list the hormones discussed in lecture and the textbook, including their target tissues, their effects on those tissues and the control of their secretion (including hypothalamic releasing hormones).
31. Identify structures, functions and mechanisms of the cardiovascular and immune systems and their contributions to homeostasis - diagram the structure of the heart and define each part's relationship to the cardiac cycle and the electrocardiogram (ECG) - identify the factors that determine blood pressure and predict changes in blood pressure and formation of interstitial fluid - identify the components of

- blood, how they are formed and their functions in the body, including coagulation and defense against pathogens - identify the structure, names and locations of different blood vessels and lymphatic vessels and trace a complete pathway through the circulatory system and the lymphatic system.
32. Identify structures, functions and mechanisms of the respiratory system and their contribution to homeostasis - identify the structures of the respiratory system and their function from the external openings (nostrils and mouth) to the alveoli - define ventilation, gas exchange, and gas transport and identify explain the mechanisms of each - identify the respiratory volumes and capacities as discussed in laboratory and lecture and explain their significance -distinguish between minute ventilation and alveolar ventilation, including the concept of "dead space" - identify the structures involved in the control of respiration, including peripheral and central chemoreceptors and what they respond to - predict the response of the respiratory system to metabolic acid-base disturbances, and the kinds of acid-base disturbances that can result from dysfunction of the respiratory system, including hyperventilation and hypoventilation.
 33. Identify structures, functions and mechanisms of the urinary system and their contributions to homeostasis - list the structure of the nephron and the function of each structure - distinguish between glomerular filtration, tubular reabsorption, tubular secretion and urinary excretion - identify the hormones involved in control of water balance and sodium balance, their target cells, their actions and how their secretion is controlled - predict the response of the kidneys to respiratory acid-base disturbances and the kinds of acid-base disturbances that can result from dysfunction of the kidneys - distinguish between diabetes mellitus and diabetes insipidus and identify the mechanisms of their symptoms.
 34. Identify structures, functions and mechanisms of the digestive system and their contributions to homeostasis - identify the structures of the alimentary canal, including the mucosa, submucosa, circular smooth muscle, longitudinal smooth muscle and the various nerve plexuses, and list their roles in digestion - describe the actions of the various digestive system hormones (secretin, CCK, gastrin) and identify their target tissues, their sources and the control of their secretion - identify the action of the various GI enzymes, their sources, their substrates and the importance of their actions in the processes of digestion and absorption - distinguish between mechanical digestion, chemical digestion and absorption and explain their role in nutrition - describe the role of the liver in bile formation, the role of the gall bladder in bile storage and the role of bile in digestion.
 35. Identify structures, functions and mechanisms of the reproductive systems and their contributions to homeostasis as well as their role in propagation of the species - describe the gross anatomy of the female and male reproductive systems, including the external genitalia, and describe how these structures facilitate fertilization of the egg by sperm - identify the steps in gametogenesis in both sexes, including the hormones, structures and processes involved - list the hormonal changes and the resulting actions that occur during the female menstrual cycle, during pregnancy and during parturition - list the available means of birth control; identify the effectiveness of the various methods in terms of preventing pregnancy as well as STD's and the risk factors associated with them - define the following terms: gene, allele, chromosome, chromatid, inheritance, dominant, recessive, genotype, phenotype, trait, sex-linked and autosomal.
 36. Identify structures, functions and mechanisms of the reproductive systems and their contributions to homeostasis as well as their role in propagation of the species continued... - predict the genotypes and phenotypes possible for a child given the genotypes of the parents.
 37. Measure blood pressure using sphygmomanometry.
 38. Perform and interpret the results of urinalysis on a simulated specimen.
 39. Identify structures on anatomical models.
 40. Weigh, pipette, mix and incubate reagents properly and follow rules for general lab safety as set forth in the lab manual.
 41. Properly set up electrodes for measuring the ECG.
 42. Properly set up and identify the results of computer-based spirometry.

New Resources for Course

Course Textbooks/Resources

Textbooks

Shier, D., Butler, J., & Lewis, R.. *Hole's Human Anatomy and Physiology*, 15 ed. McGraw Hill, 2021

Manuals

Grossman, E.. Lab Manual: Bio 111, XanEdu Printing, 05-01-2021

Periodicals

Software

Equipment/Facilities

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Susan Dentel</i>	<i>Faculty Preparer</i>	<i>May 07, 2021</i>
Department Chair/Area Director: <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>May 12, 2021</i>
Dean: <i>Victor Vega</i>	<i>Recommend Approval</i>	<i>May 20, 2021</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Sep 02, 2021</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Oct 01, 2021</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Oct 10, 2021</i>