

## Washtenaw Community College Comprehensive Report

### BIO 109 Essentials of Human Anatomy and Physiology Effective Term: Spring/Summer 2025

#### Course Cover

**College:** Math, Science and Engineering Tech

**Division:** Math, Science and Engineering Tech

**Department:** Life Sciences

**Discipline:** Biology

**Course Number:** 109

**Org Number:** 12110

**Full Course Title:** Essentials of Human Anatomy and Physiology

**Transcript Title:** Essen. Human Anatomy & Physi

**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.**

**Outcomes/Assessment**

**Rationale:** Master syllabus update following assessment. Updating standard of success for all outcomes.

**Proposed Start Semester:** Winter 2024

**Course Description:** In this course, students are introduced to the essential elements of human anatomy and physiology. This course surveys the anatomy and physiology of all human body systems. The lab emphasizes those elements of human anatomy that are of special importance to medical fields including radiography and medical billing and coding. It is intended for students entering some programs in allied health. This course will not meet WCC's nursing or physical therapist assistant program admissions requirements.

#### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor: 45 Student: 45**

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

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

**Total Contact Hours: Instructor: 90 Student: 90**

**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 Biology

or

**Prerequisite**

BIO 101 minimum grade "C"

or

**Prerequisite**

BIO 102 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. Use correct terminology when referring to the structure and function of the human body at all levels, including molecular, biochemical, cellular, histological and organismal.

**Assessment 1**

Assessment Tool: Outcome-related multiple choice and/or short answer questions on unit exam and/or cumulative final exam

Assessment Date: Fall 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department 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 and/or short answer questions on unit exam and/or cumulative final exam

Assessment Date: Fall 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department faculty

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

#### **Assessment 1**

Assessment Tool: Outcome-related multiple choice and/or short answer questions on unit exam and/or cumulative final exam

Assessment Date: Fall 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department faculty

- Demonstrate proficiency in lab-based skills.

#### **Assessment 1**

Assessment Tool: Outcome-related lab quiz consisting of multiple choice or short answer question

Assessment Date: Fall 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department faculty

### **Course Objectives**

- Distinguish between electrons, protons, neutrons, atoms, elements, molecules, compounds and ions.
- Correctly apply anatomical terminology, including directional terms and regional terms; anatomical position and sectional planes.
- Identify the extracellular and intracellular fluid compartments in the body.
- Define "internal environment" and identify the body fluid compartments that comprise it.
- Define homeostasis and identify examples.
- Identify the components of a negative feedback control system.
- Identify the properties and functions of selected carbohydrates, proteins, nucleic acids and lipids.
- Identify the connection between gene expression and cellular differentiation.
- Use the pH scale to identify the acidity or alkalinity of a solution.
- Distinguish between simple diffusion, facilitated diffusion and active transport, and identify examples in the body.
- Correctly use the terms osmosis, osmotic pressure, hypertonic, hypotonic and isotonic.
- Identify the structures and functions of a eukaryotic cell, including the membrane, nucleus, cytosol and cytoplasmic organelles.
- Identify the molecules and process involved in cellular metabolism.
- Identify the various body cavities and their associated membranes.
- Identify the organs in the respective body cavities, the systems that they are part of and the contribution of those systems to homeostasis.
- Identify and define the four main tissue types, their subgroups and their special structures.
- 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 functions -distinguish between hypothermia, hyperthermia and fever
- Identify structures, functions 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 selected bone markings by description, by appearance on the surface, and by palpation
19. Identify structures, functions and mechanisms of the muscular 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
  20. Identify structures, functions and mechanisms of the nervous system and their contributions to homeostasis -identify selected parts of the brain, brainstem, spinal cord and their function -explain the electrical and chemical events at the synapse. -identify the structure and function of the various sensory receptors -identify the difference between spinal and cranial nerves
  21. Identify structures, functions and mechanisms of the endocrine system and their contributions to homeostasis -recognize selected mechanisms of hormone action on target cells -recognize different mechanisms of control of hormone secretion and their importance in maintaining plasma hormone levels -recognize selected hormones and their effects on their target tissues, and how secretion of each of these hormones is controlled.
  22. 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 -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 locations of selected blood vessels. -trace a complete pathway through the circulatory system
  23. Identify structures, functions and mechanisms of the respiratory system and their contributions to homeostasis -recognize the definitions of ventilation, gas exchange, and gas transport and identify the mechanisms of each -identify selected respiratory volumes and capacities -identify the structures involved in the control of respiration, including peripheral and central chemoreceptors and what they respond to -identify the acid-base disturbances that can result from dysfunction of the respiratory system, including hyperventilation and hypoventilation
  24. Identify structures, functions and mechanisms of the urinary system and their contributions to homeostasis -recognize the structures and functions of a nephron -identify 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 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
  25. Identify structures, functions and mechanisms of the digestive system and their contributions to homeostasis -identify the histology 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 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 recognize their role in nutrition -recognize the role of the liver in bile formation, the role of the gall bladder in bile storage, and the role of bile in digestion
  26. Identify structures, functions and mechanisms of the reproductive systems and their contributions to homeostasis and reproduction. -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 -identify the hormonal and anatomical changes that occur during the female menstrual cycle, during pregnancy, and during parturition -identify 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
  27. Perform and interpret the results of urinalysis on a simulated specimen.
  28. Identify structures on anatomical models and cadavers, if available.

29. Weigh, pipette, mix, and incubate reagents properly while following rules for general lab safety as set forth in the lab manual.
30. Properly set up and identify the results of computer-based spirometry.

## New Resources for Course

### Course Textbooks/Resources

#### Textbooks

Shier, David, et al. *Essentials of Human Anatomy and Physiology*, 14 ed. McGraw Hill, 2021, ISBN: 9781265509484.

#### Manuals

Grossman, E. et al.. Lab Manual: BIO 109/111, XANEDU, 09-01-2022

#### Periodicals

#### Software

### Equipment/Facilities

Level III classroom

Other: Cadaver study room

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Susan Dentel</i>	<i>Faculty Preparer</i>	<i>Feb 17, 2023</i>
<b>Department Chair/Area Director:</b> <i>Susan Dentel</i>	<i>Recommend Approval</i>	<i>Feb 17, 2023</i>
<b>Dean:</b> <i>Tracy Schwab</i>	<i>Recommend Approval</i>	<i>Feb 22, 2023</i>
<b>Curriculum Committee Chair:</b> <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Apr 08, 2025</i>
<b>Assessment Committee Chair:</b> <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Apr 17, 2025</i>
<b>Vice President for Instruction:</b> <i>Brandon Tucker</i>	<i>Approve</i>	<i>Apr 23, 2025</i>

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**Reason for Submission:** Three Year Review / Assessment Report

**Change Information:**

**Consultation with all departments affected by this course is required.**

**Outcomes/Assessment**

**Objectives/Evaluation**

**Rationale:** 3-year Syllabus Review

**Proposed Start Semester:** Winter 2019

**Course Description:** In this course, students are introduced to the essential elements of human anatomy and physiology. This course surveys the anatomy and physiology of all human body systems. The lab emphasizes those elements of human anatomy that are of special importance to medical fields including radiography and medical billing and coding. It is intended for students entering some programs in allied health. This course will not meet WCC's nursing or physical therapist assistant program admissions requirements.

#### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor:** 45 **Student:** 45

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**Total Contact Hours: Instructor:** 90 **Student:** 90

**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 Biology

or

**Prerequisite**

BIO 101 minimum grade "C"

or

**Prerequisite**

BIO 102 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

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MTA Lab Science

**Request Course Transfer**

**Proposed For:**

**Student Learning Outcomes**

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

**Assessment 1**

Assessment Tool: Multiple choice and/or short answer questions on unit exam and/or cumulative final exam

Assessment Date: Winter 2019

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 100% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department faculty

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

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

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How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 100% of the students will score 70% or higher on the pool of questions used to assess this outcome

Who will score and analyze the data: Department faculty

#### 4. Demonstrate proficiency in lab-based skills.

##### **Assessment 1**

Assessment Tool: Lab quiz consisting of multiple choice or short answer question

Assessment Date: Winter 2019

Assessment Cycle: Every Three Years

Course section(s)/other population: All

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6. Identify the components of a negative feedback control system.
7. Identify the properties and functions of selected carbohydrates, proteins, nucleic acids and lipids.
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28. Identify structures on anatomical models and cadavers, if available.
29. Weigh, pipette, mix, and incubate reagents properly while following rules for general lab safety as set forth in the lab manual.
30. Properly set up and identify the results of computer-based spirometry.

## **New Resources for Course**

### **Course Textbooks/Resources**

#### Textbooks

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#### Manuals

Grossman, E. et al.. Lab Manual: BIO 109/111, Hayden McNeill, 01-01-2017  
Periodicals  
Software

**Equipment/Facilities**

Level III classroom  
Other: Cadaver study room

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Anne Heise</i>	<i>Faculty Preparer</i>	<i>Sep 20, 2018</i>
<b>Department Chair/Area Director:</b> <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>Sep 20, 2018</i>
<b>Dean:</b> <i>Kristin Good</i>	<i>Recommend Approval</i>	<i>Sep 25, 2018</i>
<b>Curriculum Committee Chair:</b> <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Oct 29, 2018</i>
<b>Assessment Committee Chair:</b> <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Oct 30, 2018</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Nov 02, 2018</i>