

ITT Technical Institute
AP2535
Human Anatomy and Physiology I
Online Course

SYLLABUS

Credit hours: 6

Contact/Instructional hours: 86 (34 Theory Hours, 52 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

None.

Course Description:

This course introduces students to anatomy and physiology of the human body using a systems approach, focusing on the integumentary system, bones and skeletal tissues, joints, muscles, the nervous system, special senses and the endocrine system. This course includes a laboratory component.

Where Does This Course Belong?

Program Information

Program Scope and Core Content Areas

General Studies courses are interdisciplinary courses that support both core and general education courses.

General Education courses include courses in the humanities, composition, mathematics, the sciences, and the social sciences.

Program Goals and Objectives

General Education courses are designed to provide ITT Tech students with a well-rounded education in the context of their technical programs. Each course emphasizes one or more of ITT Tech's General Education Student Learning Outcomes.

1. Demonstrate personal responsibility.
2. Analyze information.
3. Solve complex problems.
4. Communicate effectively in oral, written and visual forms.
5. Contribute as a member of a team.
6. Pursue lifelong learning opportunities.

Career Impact

General Education courses provide breadth to a core technical program. Courses in General Education are intended to broaden a student's educational experience, and therefore, broaden his/her perspective.

NOTE: Refer to the catalog for the state-specific course and program information, if applicable.

Course Summary

Major Instructional Areas

1. Introduction to the structure and function of the human body
2. The integumentary system
3. The skeletal system
4. The muscular system
5. The physics of movement
6. The nervous system
7. The sense organs
8. The endocrine system

Course Objectives

1. Describe the interactions between each of the organ systems in the human body.
2. Relate the study of biological chemistry to the field of human anatomy and physiology.
3. Differentiate between the anatomy and physiology of cells and tissues.
4. Explain the structure, function, and common disorders affecting the integumentary system.
5. Examine the structure, function, and common disorders affecting the skeletal system.
6. Examine the structure, function, and common disorders affecting the muscular system.
7. Describe how bones and muscles work in combination to produce movement of the body.
8. Examine the structure, function, and common disorders affecting the central nervous system.
9. Examine the structure, function, and common disorders affecting the peripheral nervous system.
10. Examine the structure, function, and common disorders affecting the sense organs.
11. Examine the structure, function, and common disorders affecting the endocrine system.
12. Demonstrate knowledge and laboratory skills required for dissection.
13. Use the ITT Tech library and other ITT resources to research various topics as appropriate.

Detailed Topical Outline

1. Overview of the Body and Biological Chemistry
 - 1.1. Structure and Function
 - 1.1.1. Organization of the Human Body
 - 1.1.2. Planes
 - 1.1.3. Organs
 - 1.1.4. Body Cavities
 - 1.1.5. Serous Membranes and Fluid
 - 1.2. Basic Biological Principles

- 1.2.1. Life Processes and Feedback Mechanisms
- 1.3. Structure and Function
 - 1.3.1. Anatomical Terms
- 1.4. Basic Chemistry
 - 1.4.1. Chemical Bonds
 - 1.4.2. Chemical Reactions
- 1.5. Chemical Basis of Life
 - 1.5.1. Inorganic and Organic Compounds
 - 1.5.2. Homeostatic Imbalances
 - 1.5.3. Homeostasis
- 2. Cell Anatomy and Physiology
 - 2.1. Cell Structure and Function
 - 2.1.1. Cell Structure and Function
 - 2.1.2. The Cellular Level of Organization
 - 2.1.3. Cell Structure
 - 2.1.4. Cell Structure and Function Activity Sheet
 - 2.2. Plasma Membrane
 - 2.2.1. Plasma Membrane Structure and Function
 - 2.2.2. Transport Across the Plasma Membrane: Passive Transport
 - 2.3. Cytoplasm
 - 2.3.1. Cytoplasm and the Nucleus
 - 2.3.2. Protein Synthesis
 - 2.4. Somatic and Reproductive Cell Division
 - 2.4.1. Somatic and Reproductive Cell Division
 - 2.4.2. Somatic Cell Division: Mitosis and Cytokinesis
- 3. Tissues
 - 3.1. Classification
 - 3.1.1. Classification of Tissues and Function of Junctions
 - 3.1.2. Tissue Structure Identification
 - 3.1.3. Tissue Location and Function
 - 3.1.4. Observation of Fresh Tissue in Chicken Leg
 - 3.1.5. Cell and Tissue Identification and Location
 - 3.2. Epithelial, Connective, Muscle, and Nervous Tissue
 - 3.2.1. Epithelial, Connective, Muscle, and Nervous Tissue
 - 3.2.2. Tissue Repair
 - 3.2.3. Cell and Tissue Function
 - 3.3. Membranes

- 3.3.1. Membranes
- 4. The Integumentary System
 - 4.1. Structure and Function of the Skin
 - 4.1.1. Structure of Skin: Epidermis, Dermis, Hypodermis, and Skin Color
 - 4.1.2. Skin Repair
 - 4.1.3. Overcoming the Perils of Canoe Lake
 - 4.1.4. Major Divisions of the Skin and Fingerprints
 - 4.2. Structure and Function of the Hair, Nails, and Skin Glands
 - 4.2.1. Accessory Structures of the Skin: Hair, Skin Glands, and Nails
 - 4.2.2. Accessory Structures of the Skin
 - 4.2.3. Real Anatomy Activity Sheet (Optional)
 - 4.2.4. Skin Cancer
- 5. Skeletal System
 - 5.1. Axial and Appendicular Skeleton
 - 5.1.1. Structure and Functions of the Skeletal System, Bone Formation, Growth, and Remodeling
 - 5.1.2. The Axial Skeleton
 - 5.1.3. The Appendicular Skeleton
 - 5.1.4. Case Study: Hassan's Story
 - 5.1.5. Dissection
 - 5.1.6. Bone Structure and Function
 - 5.1.7. Real Anatomy: The Axial and Appendicular Skeleton
 - 5.2. Articulations
 - 5.2.1. Articulations
- 6. The Muscular System
 - 6.1. Action of Bones and Muscles (Physics)
 - 6.1.1. Location, Structure, and Function of Skeletal, Cardiac, and Smooth Muscle
 - 6.1.2. The Aging Musculoskeletal System
 - 6.1.3. Skeletal Muscle Structure; Sarcomere Structure and the Sliding Filament Mechanism of Contraction; and the Neuromuscular Junction
 - 6.1.4. Skeletal Muscle Structure Sarcomere Structure and the Sliding Filament Mechanism of Contraction; and the Neuromuscular Junction II
 - 6.1.5. Origin, Insertion, Action of Selected Skeletal Muscles
 - 6.2. Microanatomy of Muscle Tissue
 - 6.2.1. Microanatomy of Skeletal Muscles and the Neuromuscular Junction
 - 6.3. Muscle Contraction
 - 6.3.1. Muscle Tension and Types of Skeletal Muscle Fibers

- 6.3.2. Skeletal Muscles Produce Movement
- 6.4. Muscle Nomenclature
 - 6.4.1. Skeletal Muscle Identification
- 7. The Central Nervous System
 - 7.1. Organization of the Central Nervous System
 - 7.1.1. Introduction to the Nervous System
 - 7.1.2. The Central Nervous System
 - 7.2. Anatomy of Neurons
 - 7.2.1. Neuron Communication: It's All About Voltage and Neurotransmitters
 - 7.3. Nerve Impulses and Synaptic Transmission
 - 7.3.1. Neuron Communication: It's All About Voltage and
 - 7.4. Anatomy of the Brain and Spinal Cord
 - 7.4.1. Brain Structure and Function
 - 7.4.2. Spinal Cord Structure and Function
 - 7.4.3. The Effects of Selected Drugs and Diseases on the Central Nervous System
 - 7.4.4. Structure and Function of the Brain and Spinal Cord (Optional)
- 8. The Peripheral Nervous System
 - 8.1. Classification of Sensory Receptors
 - 8.1.1. Cranial and Spinal Nerves
 - 8.2. Nerve Structure
 - 8.2.1. Autonomic Nervous System Structure and Function
 - 8.3. Somatic and Autonomic Divisions of the PNS
 - 8.3.1. Somatic, Motor, and Integrative Systems
 - 8.3.2. Nick's Story
 - 8.3.3. Autonomic Nervous System Structure and Function
 - 8.3.4. Somatic Sensory and Motor Pathways
 - 8.4. Reflex Arcs
 - 8.4.1. Reflexes and Reflex Arcs
 - 8.5. Cranial Nerve Function
 - 8.5.1. Cranial Nerve Function (Optional)
- 9. The Sense Organs
 - 9.1. Physiology of Smell and Taste
 - 9.1.1. Chemical Senses: The Senses of Smell and Taste
 - 9.1.2. Chemical Senses: The Senses of Smell and Taste (Optional)
 - 9.2. Anatomy and Physiology of the Eye
 - 9.2.1. Eyes and Vision
 - 9.2.2. The Aging Special Senses

- 9.2.3. The Structure of the Eye and Vision
- 9.3. Anatomy and Physiology of Hearing
 - 9.3.1. Hearing and Equilibrium
- 10. The Endocrine System
 - 10.1. Organs of the Endocrine System
 - 10.1.1. Overview of Endocrine System, Glands, and Hormones
 - 10.1.2. Organs of the Endocrine System
 - 10.1.3. Endocrine System Match Game
 - 10.2. Classification and Characteristics of Hormones
 - 10.2.1. Classification and Characteristics of Hormones
 - 10.2.2. Hormone Action
 - 10.3. Age-Related Changes to the Endocrine System
 - 10.3.1. The Endocrine System: Diseases and Age-Related Changes
- 11. Course Review, Final Examination, and Lab Practical

Learning Materials and References

Required Resources

Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Jenkins, G., Kemnitz, C., and Tortora, G. (2013). <i>Anatomy and physiology</i> (3 rd ed.). Hoboken, NJ: John Wiley & Sons, Inc.	■		■
Allen, C. and Harper, V. (2013). <i>Laboratory manual for anatomy and physiology</i> (5 th ed.). Hoboken, NJ: John Wiley & Sons, Inc.	■		■
Allen, C., Harper, V., Lancraft, T, and Ivlev, Y. (2013). PowerPhys 3.0 [Online Resource Access Code located in laboratory manual for anatomy and physiology]. Hoboken, NJ: John Wiley & Sons, Inc.	■		■
Allen, C. and Harper, V. (2013). <i>Fetal pig dissection: A laboratory guide</i> (3 rd ed.). Hoboken, NJ: John Wiley & Sons, Inc.	■		■
<i>Real Anatomy 2.0</i> [Web Product-code included in text package]. 2012. Nielson, M. and Miller, S. Hoboken, NJ: John Wiley & Sons, Inc.	■		■
LabPaq customized lab kit for ITT	■		■

Recommended Resources

Professional Associations

- Human Anatomy and Physiology Society (HAPS)
<http://www.hapsweb.org/> (accessed 4/27/2011)
 Various articles, exams, safety manuals, etc. on anatomy and physiology can be found at this site, established for students and private companies.
- American Association of Anatomists (AAA)
<http://www.anatomy.org/> (accessed 4/27/2011)
 Via research, education, and professional development activities, AAA focuses on anatomical form and function.
- American Physiological Society (APS)

<http://the-aps.org/> (accessed 4/27/2011)

APS is a nonprofit society devoted to fostering education, scientific research, and dissemination of information in the physiological sciences.

ITT Tech Virtual Library (accessed via Student Portal)

ITT Tech Virtual Library

Log on to the ITT Tech Virtual Library at <http://library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

Books

You may click “Books” or use the “Search” function on the home page to find the following books.

ITT Tech Virtual Library> Books> eBooks on EbscoHost>

- Layman, D. (2004). *Physiology demystified*. New York: McGraw-Hill Professional.
- Montgomery, R. & Gilland, K. (2003). *Appleton & lange review of anatomy* (6th ed.). New York: McGraw-Hill Professional.
- Pack, P. (2001). *Cliffs quick review anatomy and physiology*. New York: Cliff Notes,

ITT Tech Virtual Library> Books> Ebrary>

- Layman, D. *Anatomy Demystified*. (2004). New York: McGraw-Hill Professional.
- Leonard, R. (1995). *Human gross anatomy: An outline text*. New York: Oxford University Press.

Periodicals

You may click “Periodicals” or use the “Search” function on the home page to find the following periodicals.

ITT Tech Virtual Library> Periodicals> EbscoHost CINAHL Plus with Full Text>

- Search nursing and allied health journals

Reference Resources

You may click “Reference” or use the “Search” function on the home page to find the following reference resources.

ITT Tech Virtual Library> Reference > Grammar, Writing, and Style

- APA Style
Style information from the American Psychological Association
- Plagiarism: What It Is and How to Recognize and Avoid It

An article by the Writing Tutorial Services, Indiana University, Bloomington, IN

Other References

The following online resources may be found **outside** of the ITT Tech Virtual Library.

Wiley Portal:

- Wiley Student Companion Site

Wiley offers a Student Companion Site for the course's required text. Log on to:

<http://bcs.wiley.com/he-bcs/Books?action=index&bcsId=6942&itemId=0470598913>

Or you can log on to www.wiley.com, then type the text isbn (0470598913) in the search bar on the upper right hand side of the web page and click the search button. You will then be taken to a screen with the text cover image and title listed. Click on the "Visit the Companion Sites" link under the text title and then click on the "Student Companion Site" link from the drop down menu.

Wiley offers a Student Companion Site for the course's required lab manual. Log on to: [http://bcs.wiley.com/he-](http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118344405&bcsId=8576)

[bcs/Books?action=index&itemId=1118344405&bcsId=8576](http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118344405&bcsId=8576)

Or you can log on to www.wiley.com, then type the text isbn (1118344405) in the search bar on the upper right hand side of the web page and click the search button. You will then be taken to a screen with the text cover image and title listed. Click on the "Visit the Companion Sites" link under the text title and then click on the "Student Companion Site" link from the drop down menu.

- Wiley Media Site

There are many media elements included in this course, including interactivities, animations, and videos. You can access all of the links to the media on a specific web site set up for ITT Technical Institute at: <http://mywiley.info/ITTAPSTUD>

Click on the book. Then, click on Student Resources. Choose the Unit. Accept the Agreement, enter the password, and log in. Choose the Unit one more time. Click on the media element to begin.

Password: ittstu

Web sites

- Cadaver Dissection Videos
<http://www.lawrencegaltman.com/Naugbio/CADAVER/GALLERY.htm> (accessed 11/25/2013)

Video footage from the University of Wisconsin Medical College cadaver dissections for the study of Anatomy

- Visible Human Project
http://www.nlm.nih.gov/research/visible/visible_human.html (accessed 11/25/2013)
Complete, anatomically detailed, three-dimensional models of the normal male and female human bodies produced from cadaver sections
- University of Minnesota Web Anatomy
<http://msjensen.cehd.umn.edu/webanatomy/> (accessed 11/25/2013)
Collection of study aids for anatomy and physiology
- Loyola University Medical Education Network—Master Muscle List
<http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/dissector/mml/index.htm> (accessed 11/25/2013)
A quick reference for information on the origin, insertion, nerve supply, and action of any given muscle in the body
- University of Delaware—Histology
<http://www.udel.edu/biology/Wags/histopage/histopage.htm> (accessed 11/25/2013)
Collections of color and low-magnification histology images, cell and tissue ultrastructure images, and 3D models.
- Loyola University Medical Education Network (LUMEN)
http://www.lumen.luc.edu/lumen/meded/Histo/frames/histo_frames.html (accessed 11/25/2013)
Collection of histology slides that can be used for study and review

NOTE: All links are subject to change without prior notice.

Information Search

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Biological Chemistry
- Cell Anatomy and Physiology
- Tissues
- Integumentary System
- Skeletal System

- Muscular System
- Central Nervous System
- Peripheral Nervous System
- Endocrine System

Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none"> ▪ Do take a proactive learning approach ▪ Do share your thoughts on critical issues and potential problem solutions ▪ Do plan your course work in advance ▪ Do explore a variety of learning resources in addition to the textbook ▪ Do offer relevant examples from your experience ▪ Do make an effort to understand different points of view ▪ Do connect concepts explored in this course to real-life professional situations and your own experiences 	<ul style="list-style-type: none"> ▪ Don't assume there is only one correct answer to a question ▪ Don't be afraid to share your perspective on the issues analyzed in the course ▪ Don't be negative about the points of view that are different from yours ▪ Don't underestimate the impact of collaboration on your learning ▪ Don't limit your course experience to reading the textbook ▪ Don't postpone your work on the course deliverables – work on small assignment components every day

Instructional Methods

The curriculum is designed to encourage a variety of teaching strategies that support the course objectives while fostering higher cognitive skills. This course will employ multiple methods to deliver content and inspire and engage you, including lectures, collaborative learning options, and hands-on activities. This course is composed of theory and laboratory components. Your progress will be regularly assessed through Assignments, Case Studies, Labs, Quizzes, and a Final Exam and Lab Practical.

Out-of-Class Work

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

Course Outline

Unit 1: OVERVIEW OF THE BODY AND BIOLOGICAL CHEMISTRY

Upon completion of this unit, students are expected to:

- Describe the six levels of structural organization and the eleven systems of the human body.
- Outline the six most important life processes that distinguish living organisms from nonliving objects.
- Explain how homeostasis is maintained through negative and positive feedback systems, and how it can be disrupted by diseases and disorders.
- Describe the human body using the anatomical position and specific terms.
- Distinguish among the major cavities of the body and their subdivisions.
- Identify the locations of the various serous membranes.
- Distinguish between the regions and quadrants of the abdominopelvic cavity.
- Describe the structures of atoms, ions, molecules, and compounds.
- Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.
- Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.
- Explain the importance of water, salts, acids, and bases in the functioning of the human body.
- Describe organic molecules and explain the importance of carbon in their structure.
- Explain the functions of carbohydrates in the human body.
- Explain the functions of lipids in the human body.
- Explain the functions of proteins in the human body.
- Describe the composition and function of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA).
- Explain the composition and function of adenosine triphosphate (ATP).

**Total
outside
work:**
7.5 hours

	Author	Chapter/Title	Pages (if necessary)	Total Pages
READING ASSIGNMENT	Jenkins	Chapter 1	pp.2-27	26
		Chapter 2	pp. 24-61	38
		Chapter 3 (for Unit 2)	pp. 62-105	44
	Allen	Exercises 1 and 2	pp. 5-6; 15-18	6
		Exercise 4 (for Unit 2)	pp. 33-34	2
		Exercise 5 (for Unit 2)	pp. 41; 43-46	5
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Units 1 and 2			5 hrs
	Work Unit 1 Assignment 1: Homeostatic Imbalances			2 hrs
	Review the Real Anatomy site navigation			.5 hr

<p>Unit 2: CELL ANATOMY AND PHYSIOLOGY</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> ▪ Describe the functions of the three main parts of the cell. ▪ Describe how the structure of the plasma membrane allows it to regulate exchanges with the extracellular environment. ▪ Describe the processes that transport substances into and out of the cell. ▪ Describe the functions of the cytoplasm components. ▪ Describe the structures and functions of the cytosol and the various organelles. ▪ Distinguish whether each step in protein synthesis is part of the transcription or translation process. ▪ Describe the structure and function of the nucleus. ▪ Describe the sequence of events in protein synthesis. ▪ Compare and contrast the processes of somatic and reproductive cell division. ▪ Apply knowledge of cellular functions to a case study. 				<p>Total outside work: 8 hours</p>
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapter 4 (for Unit 3)	pp. 106-141	36
	Allen	Exercise 6 (for Unit 3)	pp. 51-52; 60-61; 70; 73	6
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 3			3 hrs
	Work on Unit 2 Assignment 1: Cell Structure and Function			3 hrs
	Work on Unit 2 Lab 1: Transport Across the Plasma Membrane: Passive Transport			1 hr
	Work on Unit 2 Case Study 1: The Cellular Level of Organization			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 1 Assignment 1: Homeostatic Imbalances (assigned in Unit 1)		2.5%

<p>Unit 3: TISSUES</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> ▪ Distinguish among the structure and function of the four basic types of body tissues. ▪ Describe the structure and functions of cell junctions ▪ Distinguish among the structures, locations, and functions of the various types of epithelial tissue. ▪ Distinguish among the structures, locations, and functions of the various types of connective tissue. ▪ Describe the main differences between epithelial and connective tissues. ▪ Distinguish among the structures, locations, and functions of the various types of membranes. ▪ Distinguish among the structures, mode of control, locations, and functions of skeletal, cardiac, and smooth muscle tissue. ▪ Describe the general characteristics of nervous tissue. ▪ Explain the factors that influence tissue repair. 				<p>Total outside work: 9 hours</p>
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapter 5 (for Unit 4)	pp. 142-161	20
	Allen	Exercise 7 (for Unit 4)	pp. 83-84; 86; 89; 90	5
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 4			2 hrs
	Work on Unit 3 Assignment 1: Cell and Tissue Function			2 hrs
	Work on Unit 3 Lab 1: Cell and Tissue Identification and Location			1 hr
	Study for Exam 1			4 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 2 Assignment 1: Cell Structure and Function (assigned in Unit 2)		2.5%
	Lab	Unit 2 Lab 1: Transport Across the Plasma Membrane: Passive Transport (assigned in Unit 2)		2.5%
	Case Study	Unit 2 Case Study 1: The Cellular Level of Organization (assigned in Unit 2)		2.5%

Unit 4: THE INTEGUMENTARY SYSTEM				Total outside work: 10 hours
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> ▪ Describe the general structure of skin. ▪ Describe the cells and layers of the epidermis. ▪ Outline the structural features of the dermis. ▪ Explain the factors that contribute to skin color. ▪ Describe the structure and function of hair, skin glands, and nails. ▪ Compare the structure and functions of thin skin and thick skin. ▪ List the functions of skin and explain how the skin accomplishes them. ▪ Compare the events of epidermal wound healing and deep wound healing. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapter 6-9 (for Unit 5)	pp. 162-181, 246-254	29
	Allen	Exercises 8-11 (for Unit 5)	pp. 95-97; 106-118; 122; 128-130; 138-150; 159-160; 163-167	39
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 5			5 hrs
	Work on Unit 4 Assignment 1: Reading Guide for Unit 5			2 hrs
	Work on Unit 4 Case Study 1: Overcoming the Perils of Canoe Lake			1 hr
	Work on Unit 4 Case Study 2: Skin Cancer			1 hr
Prepare for the presentation on Overcoming the Perils of Canoe Lake			1 hr	
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 3 Assignment 1: Cell and Tissue Function (assigned in Unit 3)		2.5%
	Lab	Unit 3 Lab 1: Cell and Tissue Identification and Location (assigned in Unit 3)		2.5%
	Exam	Unit 4 Exam 1		5%

Unit 5: THE SKELETAL SYSTEM

Upon completion of this unit, students are expected to:

- Describe the functions of the skeletal system.
- Explain how bones are classified and recognize examples of each class.
- Identify the general features of a long bone.
- Differentiate between spongy bone and compact bone.
- Describe how bones are supplied with blood vessels and nerves and how this impacts bone function.
- Distinguish between the mechanisms of intramembranous and endochondral ossification.
- Explain how bones grow in length and thickness.
- Describe the process and purpose of bone remodeling.
- Explain how diet and hormones affect bone growth and remodeling.
- Distinguish between the axial and appendicular skeletons and describe their surface markings.
- Describe the functions of cranial and facial bones.
- Identify the locations and surface markings of the cranial bones.
- Identify each of the facial bones and their corresponding surface markings.
- Describe the bones that form the nasal septum, orbits, sutures, and paranasal sinuses and explain the value of the fontanel.
- Describe the hyoid bone and state why it is unique among the bones of the skeleton.
- Describe the structure and function of the vertebral column.
- Identify the structural features of a typical vertebra.
- Describe the structural features and the functions of vertebrae in each region of the vertebral column.
- Identify the structural features of the bones of the thoracic cage that function to protect soft tissue and provide support for the upper limbs.
- Describe the structural features of the clavicle and scapula and relate their structure and arrangement to the pectoral girdle function.
- Identify the proximal and distal long bones of the upper and lower extremities.
- Describe the structural features of the pelvic girdle.
- Describe the principal differences between male and female pelvis and relate those differences to function.
- Demonstrate your understanding that the upper and lower limbs are structurally similar.
- Differentiate between the structural and functional classifications of joints.
- Describe how the connective tissue associations restrict movement of fibrous joints.
- Describe how the structural characteristics of various cartilaginous joints affect movement.
- Identify the structural characteristics that distinguish synovial joints from fibrous and cartilaginous joints.
- Characterize the structure and movements of the six subtypes of synovial joints.
- Define joint actions and then be able to model them with your own body, using proper terminology for each movement.
- Demonstrate that the shoulder, elbow, hip, and knee joints exemplify different synovial joint classifications and movements.

**Total
outside
work:**
14 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapters 10 and 11 (for Unit 6)	pp. 278-377	99
Allen	Exercises 12, 13 and 14 (for Unit 6)	pp. 173; 176-179; 190-191; 197-224	35	

OUT-OF-CLASS WORK	Activity		Estimated Time
	Complete the reading assignment for Unit 6		9 hrs
	Work on Unit 5 Lab 1: Bone Structure and Function		1 hr
	Work on Unit 5 Lab 2: Real Anatomy: The Axial and Appendicular Skeleton		2 hrs
	Work on Unit 5 Case Study 1: Hassan's Story		2 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 4 Assignment 1: Reading Guide for Unit 5 (assigned in Unit 4)	2.5%
	Case Study	Unit 4 Case Study 1: Overcoming the Perils of Canoe Lake (assigned in Unit 4)	2.5%
		Unit 4 Case Study 2: Skin Cancer (assigned in Unit 4)	2.5%

Unit 6: THE MUSCULAR SYSTEM

Upon completion of this unit, students are expected to:

- Differentiate between skeletal, cardiac, and smooth muscle with respect to location, histology, and function.
- Characterize the four functions of all muscle tissue.
- Explain the importance of connective tissue components, blood vessels, and nerves to skeletal muscles.
- Describe the microscopic anatomy of a skeletal muscle fiber.
- Describe the neuromuscular junction and events of excitation of the muscle fiber.
- Explain the role of calcium in releasing inhibition and causing the power stroke.
- Describe how muscle tension is controlled by stimulation frequency and motor unit recruitment.
- Describe ATP production in muscle fibers.
- Differentiate between slow oxidative, fast oxidative-glycolytic, and fast glycolytic fiber types of skeletal muscle.
- Define a skeletal muscle origin versus its insertion.
- Using examples, demonstrate that skeletal muscle names are based on size, shape, action, location, or attachments.
- Associate the specific muscles of the head with the actions of facial expression, eyeball movement, biting, chewing, speech, and swallowing.
- Demonstrate that specific muscles of the neck function in speech, swallowing, and movement of the head.
- Identify specific muscles of the abdomen that protect the viscera, move the vertebral column, and/or assist in breathing.
- List the muscles inserting on the limb that move and/or stabilize the pectoral girdle, and list the muscles that move the arm, forearm, and/or hand.
- List the name and action of the deep muscles of the back that move the head and vertebral column.
- Identify the name and action of muscles originating on the pelvic girdle or lower limb that move the thigh, leg, and/or foot.

**Total
outside
work:**
15 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapters 12 and 13 (for Unit 7)	pp. 378-455	78
Allen	Exercises 16, 17 and 20 (for Unit 7)	pp. 253-254; 256; 258; 260-262; 267-271; 297-316	22	
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 7			7 hrs
	Work on Unit 6 Assignment 1: The Aging Musculoskeletal System			2 hrs
	Work on Unit 6 Lab 1: Origin, Insertion, Action of Selected Skeletal Muscles			2 hrs
	Study for Exam 2			4 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Lab	Unit 5 Lab 1: Bone Structure and Function (assigned in Unit 5)		2.5%
		Unit 5 Lab 2: Real Anatomy: The Axial and Appendicular Skeleton (assigned in Unit 5)		2.5%
	Case Study	Unit 5 Case Study 1: Hassan's Story (assigned in Unit		2.5%

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<p>Unit 7: THE CENTRAL NERVOUS SYSTEM</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> ▪ Identify the three key functions of the nervous system. ▪ Differentiate between the central and peripheral nervous systems. ▪ Describe the role of neurons. ▪ Describe the variety and function of neuroglia. ▪ Explain the role of ion channels in neuronal communication ▪ Define graded potentials in reference to the resting membrane potential. ▪ Differentiate the all-or-none action potential from a graded potential. ▪ Explain the process of neuronal conduction from the trigger zone to the axon terminals. ▪ Describe a synapse, including the electrical and chemical events at and across the presynaptic and postsynaptic membranes. ▪ Identify the two parts of the CNS and identify the protective structures. ▪ Identify the extracellular fluids that protect and nourish cells of the CNS. ▪ Identify the function and location of the cerebrum. ▪ Differentiate between the functional areas of the cerebrum, describing the differences between white and gray matter. ▪ Locate key structures of the diencephalon that function in motor and sensory processing. ▪ Identify the three parts of the brain stem, describing their functions. ▪ Describe the anatomical features of the cerebellum that contribute to coordination, muscle tone, and balance. ▪ Describe the role of the limbic system and its key anatomical features. ▪ Describe the surface features of the spinal cord and the complex connections made to the periphery. ▪ Describe the locations and functions of sensory and motor tracts of the spinal cord. 				<p>Total outside work: 11 hours</p>
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapters 14 and 15 (for Unit 8)	pp. 458-531	74
	Allen	Exercises 18, 19, 21, 22, 23 (for Unit 8)	pp. 280-282; 287-292; 325-326; 331-337; 343-345; 348-352	27
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 8			7 hrs
	Work on Unit 7 Assignment 1: Neuron Communication: It's All About Voltage and Neurotransmitters			1 hr
	Work on Unit 7 Assignment 2: The Effects of Selected Drugs and Diseases on the Central Nervous System			1 hr
	Work on Unit 7 Lab 1: The Central Nervous System			1 hr
	Prepare for the presentation on The Effects of Selected Drugs and Diseases on the Central Nervous System during class in Unit 8.			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 6 Assignment 1: The Aging Musculoskeletal System (assigned in Unit 6)		2.5%

Lab	Unit 6 Lab 1: Origin, Insertion, Action of Selected Skeletal Muscles (assigned in Unit 6)	2.5%
Exam	Unit 7 Exam 2	5%

Unit 8: THE PERIPHERAL NERVOUS SYSTEM				Total outside work: 6 hours
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> ▪ Describe the histology of a nerve. ▪ Identify the location and functions of the 12 cranial nerves. ▪ Describe a spinal nerve, identifying the associated branches and relate to the plexuses. ▪ Describe the function of a reflex arc. ▪ Characterize the function and location of the autonomic nervous system. ▪ Describe the histology of ANS with respect to neurons, ganglia, and receptors. ▪ Identify the neurotransmitters and receptor sites of the ANS, associating each with excitation or inhibition. ▪ Differentiate between the anatomical locations and functions of the sympathetic and parasympathetic nervous systems. ▪ Describe the relationship between the ANS reflexes and the hypothalamus. ▪ Describe the four events that lead to sensation. ▪ Characterize sensory receptors in a structural, functional, or stimulus detection manner. ▪ Characterize somatic sensations, associating them with four modalities of sensation. ▪ Describe the general structure and function of somatic sensory pathways. ▪ Differentiate between the somatosensory and motor areas of the cortex, relating function to surface area. ▪ Describe motor pathways and control by the basal nuclei and cerebellum. ▪ Describe the integrative functions of the brain with respect to memory and wakefulness. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapter 16 (for Unit 9)	pp. 532-575	4
	Allen	Exercise 24 (for Unit 9)	pp. 358-378	21
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 9			2 hrs
	Work on Unit 8 Assignment 1: Somatic Sensory and Motor Pathways			1 hr
	Work on Unit 8 Lab 1: Autonomic Nervous System Structure and Function			1 hr
	Work on Unit 8 Case Study 1: Nick’s Story			2 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)	
	Assignment	Unit 7 Assignment 1: Neuron Communication: It’s All About Voltage and Neurotransmitters (assigned in Unit 7)	2.5%	
		Unit 7 Assignment 2: The Effects of Selected Drugs and Diseases on the Central Nervous System (assigned in Unit 7)	2.5%	
	Lab	Unit 7 Lab 1: The Central Nervous System (assigned in Unit 7)	2.5%	

Unit 9: THE SENSE ORGANS

Upon completion of this unit, students are expected to:

- Discuss the sensation of olfaction including the epithelium, the olfactory nerve, and the sensory cortex.
- Explain the pathway for the sensation of taste including the facial, glossopharyngeal, and vagus nerves and the associated sensory cortex
- Describe the protective features of the eye.
- Characterize the three different layers of the eye.
- Describe the processes causing an image at the retina.
- Explain the neural pathway of electrical signals leaving the photoreceptors and terminating in the primary visual cortex.
- Describe the external, middle, and internal regions of the ear.
- Explain the pathway for the sensation of hearing beginning with the tympanic membrane and ending at the primary auditory cortex.
- Explain how the vestibulocochlear nerve and hair cells are related to the sensation of equilibrium.
- Discuss the sensation of olfaction including the epithelium, the olfactory nerve, and the sensory cortex.

**Total
outside
work:**
7 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins	Chapter 17 (for Unit 10)	pp. 576-613	38
	Allen	Exercise 25 (for Unit 10)	pp. 389-397	9
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment for Unit 10			3 hrs
	Work on Unit 9 Assignment 1: Chemical Senses: The Senses of Smell and Taste			1 hr
	Work on Unit 9 Assignment 2: The Aging Special Senses			2 hrs
	Work on Unit 9 Lab 1: Hearing and Equilibrium			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 8 Assignment 1: Somatic Sensory and Motor Pathways (assigned in Unit 8)		2.5%
	Lab	Unit 8 Lab 1: Autonomic Nervous System Structure and Function (assigned in Unit 8)		2.5%
	Case Study	Unit 8 Case Study 1: Nick's Story (assigned in Unit 8)		2.5%

<p>Unit 10: THE ENDOCRINE SYSTEM</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> ▪ Differentiate between the type of signal and time course of effects that the endocrine and nervous system use, allowing integration and regulation of body systems. ▪ Identify the three manners in which hormone secretion is regulated. ▪ Express the regulatory role of the hypothalamus on hormone secretion from the anterior pituitary. ▪ Identify the site of production and storage of oxytocin and antidiuretic hormone, explaining their functions. ▪ Recall the function of thyroxine, triiodothyronine, and calcitonin. ▪ Describe the function of the parathyroid glands. ▪ Differentiate between the medulla and cortex of adrenal glands. ▪ Describe the glucose regulatory function of the endocrine pancreas ▪ Identify the male and female hormones produced by the gonads. ▪ Express the regulatory role of the hypothalamus on hormone secretion from the anterior pituitary. ▪ Match hormones to the associated tissues using knowledge of other endocrine structures. 				<p>Total outside work: 13 hours</p>
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Jenkins; Allen	Review all Chapters and Exercises (for Unit 11)	As listed in Units	523
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			2 hrs
	Work on Unit 10 Assignment 1: Endocrine System Match Game			1 hr
	Work on Unit 10 Assignment 2: The Endocrine System: Diseases and Age-Related Changes			1 hr
	Work on Unit 10 Lab 1: Hormone Action			1 hr
	Study for the comprehensive Final Exam and Lab Final Exam			8 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 9 Assignment 1: Chemical Senses: The Senses of Smell and Taste (assigned in Unit 9)		2.5%
		Unit 9 Assignment 2: The Aging Special Senses (assigned in Unit 9)		2.5%
	Lab	Unit 9 Lab 1: Hearing and Equilibrium (assigned in Unit 9)		2.5%

Unit 11: COURSE REVIEW, FINAL EXAMINATION, AND LAB PRACTICAL			
Upon completion of this unit, students are expected to:			Total outside work:
<ul style="list-style-type: none"> Demonstrate an understanding of all course objectives. 			0 hours
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Assignment	Unit 10 Assignment 1: Endocrine System Match Game (assigned in Unit 10)	2.5%
		Unit 10 Assignment 2: The Endocrine System: Diseases and Age-Related Changes (assigned in Unit 10)	2.5%
	Lab	Unit 10 Lab 1: Hormone Action	2.5%
	Exam	Final Exam	15%
Lab Final Exam		10%	

Note: Your instructor may add a few learning activities that are ungraded.

Evaluation and Grading

Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	In-Class	Out-of-Class	Weight
Assignment	10%	20%	30%
Lab	12.5%	10%	22.5%
Case Study	2%	10.5%	12.5%
Exam	35%	0%	35%
TOTAL	59.5%	40.5%	100%

Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

Academic Integrity

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

(End of Syllabus)