

**ARTICULATION AGREEMENT**

**DATE DRAFTED:** October 31, 2022

**VALID ACADEMIC YEARS:** FA22-SP24

**LMC COURSE:** BIOSC-030 Introduction to Anatomy and Physiology

**HIGH SCHOOL COURSE:** Physiology

**School:** Dozier-Libbey Medical High School

**Address:** 4900 Sand Creed Road, Antioch, CA 94531

- A. COLLEGE COURSE DESCRIPTION:** This course is designed to cover basic anatomy and physiology. Fundamentals of body structure and function and the elegant interrelationships between body organs and how they perform will be explored. All of the systems of the body, including very basic microscopic anatomy and simple physiological chemistry will be covered in this one semester course.
- B. HIGH SCHOOL COURSE DESCRIPTION:** This course is an advanced life science course designed for students who have completed Biology CP. It is geared to give an introductory background to students interested in careers in nursing, dentistry, medicine, pharmacy, veterinary medicine, and the life sciences in general. A concentrated study of the human body will include the following areas: cytology, histology, skeletal and muscular systems, the nervous system and special senses, nutrition and the digestive system, the circulatory system, the respiratory system, the endocrine system, and reproductive system. Where possible, an integral part of the course will be devoted to work in the laboratory.
- C. UNITS: 4**
- D. PRE-REQUISITES: NA**
- E. REQUIRED CONTENT FOR ARTICULATION:**
- 1 – The Human Body: An Orientation**
- Define anatomy and physiology
  - Name the organ systems of the body, and briefly state the major functions of each system.
  - List eight functions that humans must perform to maintain life
  - Verbally describe or demonstrate the anatomical position
  - Use proper anatomical terminology to describe body directions, surfaces, and planes
  - Define homeostasis and explain its importance
  - Define negative feedback, and describe its role in maintaining homeostasis and normal body function
- 2 – Basic Chemistry**
- Define element, and list the four elements that form the bulk of body matter
  - Explain the importance of water to body homeostasis, and provide several examples of the roles of water
  - List several salts (or their ions) vitally important to body functioning

- Differentiate a salt, an acid, and a base
- Compare and contrast carbohydrates and lipids in terms of their building blocks, structures, and functions in the body

### **3 – Cells and Tissues**

- Describe the chemical composition of the plasma membrane, and relate it to membrane functions
- Apply the principle of complementarity to different cell types by comparing overall shapes, internal structures, and special functions
- Describe plasma membrane structure, and explain how the various transport processes account for the directional movements of specific substances across the plasma membrane
- Name the four major tissue types and their chief subcategories. Explain how the four major tissue types differ structurally and functionally
- Describe the process of tissue repair (wound healing)

### **4 – Skin and Body Membranes**

- List several important functions of the integumentary system, and explain how these functions are accomplished
- When provided with a model or diagram of the skin, recognize, and name the following skin structures: epidermis, dermis, hair and hair follicle, sebaceous gland, and sweat gland
- Name the factors that determine skin color, and describe the functions of melanin
- Differentiate among first-, second-, third-, and fourth-degree burns

### **5 – The Skeletal System**

- List at least three functions of the skeletal system
- Briefly describe the process of bone formation in the fetus, and summarize the events of bone remodeling throughout life
- Name and describe the various types of fractures
- Identify the bones of the appendicular skeleton (upper and lower limb) and their important markings.
- Name and describe the bones of the axial skeleton, including skull, ribs, and vertebra.
- Name the three major structural categories of joints, and compare the amount of movement allowed by each

### **6 – The Muscular System**

- Define and explain the role of the following: endomysium, perimysium, epimysium, tendon, and aponeurosis
- Describe the microscopic structure of skeletal muscle, and explain the role of actin and myosin containing myofilaments
- Describe how an action potential is initiated in a muscle cell
- Describe the events of muscle contraction

- Define graded response, tetanus, isotonic and isometric contractions, and muscle tone as these terms apply to a skeletal muscle
- Demonstrate or identify the different types of body movements
- Name and locate the major muscles of the human body (on a model, chart, or diagram), and state the action of each

## **7 – The Nervous System**

- Explain the structural and functional classifications of the nervous system
- Describe the general structure of a neuron, and name its important anatomical regions
- Describe the events that lead to the generation of a nerve impulse and its conduction from one neuron to another
- Define reflex arc, and list its elements
- Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalon, brain stem, and cerebellum on a human brain model or diagram
- List two important functions of the spinal cord
- Identify the site of origin, and explain the function of the sympathetic and parasympathetic divisions of the autonomic nervous system
- Contrast the effect of the parasympathetic and sympathetic divisions on the following organs: heart, lungs, digestive system, and blood vessels

## **8 - Special Senses**

- When provided with a model or diagram, identify the accessory eye structures, and list the functions of each
- Identify the structures of the external, middle, and internal ear, and list the functions of each
- Describe the location, structure, and function of the olfactory and taste receptors

## **9 – The Endocrine System**

- Describe how hormones bring about their effects in the body
- Explain how various endocrine glands are stimulated to release their hormonal products
- Discuss ways in which hormones promote body homeostasis by giving examples of hormonal actions
- List hormones produced by the endocrine glands and discuss their general functions

## **10 – Blood**

## **11 – The Cardiovascular System**

- Describe the composition and volume of whole blood
- Describe the blood clotting process
- Describe the ABO and Rh blood groups
- Describe the location of the heart in the body, and identify its major anatomical areas on an appropriate model or diagram
- Trace the pathway of blood through the heart

- Define systole, diastole, stroke volume, cardiac cycle, heart sounds, and heart murmur
- Compare and contrast the structure and function of arteries, veins, and capillaries
- Identify the body's major arteries and veins, and name the body region supplied by each
- Define blood pressure, and list factors affecting and/or determining blood pressure

## **12 – The Lymphatic System and Body Defenses**

- Name the two major types of structures composing the lymphatic system
- Describe the source of lymph, and explain its formation and transport
- Describe the protective functions of skin and mucus membranes
- Describe the inflammatory process
- Describe how fever helps protect the body
- Name the two arms of the adaptive defense system, and relate each to a specific lymphocyte (B or T cell)
- State the roles of B cells and T cells
- Distinguish between active and passive immunity

## **13 – The Respiratory System**

- Name the organs forming the respiratory passageways from the nasal cavity to the alveoli of the lungs (or identify them on a diagram or model), and describe the function of each
- Describe several protective mechanisms of the respiratory system
- Define cellular respiration, external respiration, internal respiration, pulmonary ventilation, expiration, and inspiration
- Define the following respiratory volumes: tidal volume, vital capacity, expiratory reserve volume, inspiratory reserve volume, and residual air
- Describe how oxygen and carbon dioxide are transported in the blood
- Name several physical factors that influence respiratory rate

## **14 – The Digestive System & Body Metabolism**

- Name the organs of the alimentary canal and accessory organs, and identify each on an appropriate diagram or model
- List and describe the six main activities of the digestive system
- List the six nutrient categories. Note important dietary sources and their main cellular uses
- Define metabolism, anabolism, and catabolism
- Explain the importance of energy balance in the body, and indicate consequences of energy imbalance

## **15 – The Urinary System**

- Recognize that the nephron is the structural and functional unit of the kidney, and describe its anatomy
- Describe the process of urine formation, identifying the areas of the nephron that are responsible for filtration, reabsorption, and secretion
- Explain the role of antidiuretic hormone (ADH) in the regulation of water balance by the kidney

## 16 – The Reproductive System

- When provided with a model or diagram, identify the organs of the male reproductive system, and discuss the general function of each
- Name the endocrine and exocrine products of the testes
- Describe the structure of sperm, and relate its structure to its function
- Identify the organs of the female reproductive system, and discuss the general function of each
- Define oogenesis
- Describe the influence of FSH and LH on ovarian function
- Distinguish between an embryo and a fetus
- Indicate several ways that pregnancy alters or modifies the functioning of the mother's body
- Describe how labor is initiated, and briefly discuss the three stages of labor

### F. REQUIRED COMPETENCIES (PERFORMANCE OBJECTIVES) FOR ARTICULATION

#### *LMC Learning Objectives:*

It is the expectation that all students successfully completing the course will be able to...

1. Use appropriate terminology to effectively communicate aspects of human anatomy and physiology with various audiences.
2. Identify various anatomical structures (e.g., cells, tissues, organs) and describe the interrelationships between the structure and its function.
3. Explain the various mechanisms used for regulating homeostasis and describe how body systems are integrated to maintain homeostasis.
4. Propose evidence-based hypotheses to explain how the human body functions in a real-world scenario or provide a conclusion to the functions of various structures or the physiological regulations of the human body tested in laboratory settings.

Additionally, students are expected to develop and work on refining the following cognitive skill development goals:

1. Work with others in small groups toward a common goal(s) and discuss topics related to this course in an intellectual manner.
2. Critically think for yourself and show an ability to approach issues of anatomy and physiology from an evidence-based perspective
3. Recognize that individual differences (ethnicity, gender, culture, etc.) shape our understanding of anatomy and physiology

### G. METHODS FOR END OF COURSE ASSESSMENT:

#### *Grading Policies:*

Test and Quizzes	70%	A	90 – 100
Work/Labs	20%	B	80 – 89
Final Exam	10%	C	70 – 79
		D	60 – 69
		F	59 and Below

## H. TEXTBOOKS OR OTHER SUPPORTING MATERIALS

- Essentials of Human Anatomy and Physiology, Elaine Marieb and Suzanne Keller, 13th Edition
- Pearson - Mastering A&P online textbook

## A. PROCEDURES AND/OR CRITERIA FOR COURSE ARTICULATION:

*(all of the following must be met)*

1. Students **must apply** to Los Medanos College and register in **CATEMA** in order to receive credit recommendations by their high school teacher.
2. Students **must be recommended** for credit by their high/adult ed. schoolteacher in **CATEMA**. *Teachers recommend credit at their discretion.*
3. Students **must complete** the **Physiology class at DLMHS** with an overall grade of “B” or better. *High school/Adult Ed. teachers will enter this grade in CATEMA.*
4. Students **must earn** a “B” or better on the agreed upon college/high school final exam procedure. *High school/Adult Ed. teachers will enter this exam grade in CATEMA.*
5. Articulated college credit may only be recommended by the high school teacher and received by the student **within the academic year** in which it was earned.
6. Upon completion of the above, the student will receive on his/her LMC and CCCCDC (California Community College District) transcript the units of credit for LMC’s **BIOSC-030 Intro to Anatomy/Physiology** course.
7. College transcripts will reflect the **FINAL EXAM GRADE** earned and will be notated as \*Credit by Exam.

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HIGH SCHOOL COURSE: Physiology

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### COLLEGE SIGNATURES

Natalie Hannum  
Natalie Hannum (Nov 7, 2022 11:38 PST)

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Natalie Hannum Date  
LMC Vice President of Instruction

Ryan Pedersen  
Ryan Pedersen (Nov 3, 2022 15:47 PDT)

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Ryan Pedersen Date  
LMC Dean of Instruction Math & Physical Sciences

Roy Kyle Hanks  
Roy Kyle Hanks (Nov 1, 2022 13:56 PDT)

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Roy "Kyle" Hanks Date  
LMC Biology Department Chair

James Clark

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James Clark Date  
LMC Faculty

### HIGH SCHOOL/ROP/DISTRICT SIGNATURES

Karen Clark  
Karen Clark (Nov 7, 2022 11:40 PST)

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Karen Clark Date  
DLMHS Principal

Christine Ibarra  
Christine Ibarra (Dec 15, 2022 11:14 PST)

\_\_\_\_\_  
Christine Ibarra Date  
AUSD Associate Superintendent

Amy Bettencourt  
Amy Bettencourt (Dec 15, 2022 09:48 PST)

\_\_\_\_\_  
Amy Bettencourt Date  
AUSD Director, Curriculum, Instruction & Assessment

Lindsay Wisely  
Lindsay Wisely (Nov 7, 2022 15:08 PST)

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Lindsay Wisely Date  
AUSD Director, Secondary Schools

Robert Young

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Robert Young Date  
DLMHS Faculty