LOS MEDANOS COLLEGE

**ARTICULATION AGREEMENT** **DATE DRAFTED**: October 31, 2022

**VALID ACADEMIC YEAR(S)**: FA22-SP24

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

**HIGH SCHOOL COURSE:** Introduction to Anatomy & Physiology

**School:** Pittsburg High School
**Address:** 1750 Harbor St., Pittsburg, CA 94565

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 the systems of the body, including very basic microscopic anatomy and simple physiological chemistry will be covered in this one semester course.
B. **UNITS: 4**
C. **PRE-REQUISITES: NA**
D. **HIGH SCHOOL CLASS DESCRIPTION:** This class offers a foundation for Anatomy (study of the structure and shape of the body parts) and Physiology (the study of the function of each body part) of the human body. During the year we will go over each of the body systems and how they work together while looking at case studies. This is an advanced course for students who may be interested in medical careers.

E. **REQUIRED CONTENT FOR ARTICULATION:**

**Unit 1 - Overview of the Human Body**

a) Overview of anatomy and physiology: determine the structure and function of the body b. Levels of structural organization: name cells, tissues, organs, and systems
b) Homeostasis: show how systems work together to maintain internal balance
c) Language of anatomy be able to describe location of regions
d) Students can use the appropriate terms to describe the body to various audiences
e) Use evidence to describe how the human body functions.

**Labs/Activities**

- Lab Safety
- Human Anatomy Fashion Show
- Body Systems & Planes poster
- Homeostasis/feedback loops
- Simon Says

**Unit 2 - Biochemistry**

f) Concepts of matter and energy: describe differences between molecules and compounds
g) Describe differences between major organic molecules.
h) Chemical bonds and reactions: describe how molecules are synthesized and degraded.
i) Biochemistry: describe the function of particular molecules in the body.
j) Explain the importance of water in maintaining homeostasis.
k) Use case studies to investigate the impacts of diet on health.

**Labs/Activities**

- Pattern Matching in compounds
- Paper Molecules

- Bioindicator Lab
- Murder Meal
- Nutrition Study
- Case Studies for nutrition/health

**Unit 3 - Cells & Tissues**

a) Explain how organelles contribute to the importance of different cell functions
b) Use the concentrations to describe the movement of molecules across the cell membrane/osmosis
c) Describe the fluid mosaic model of the cell membrane
d) Tissues: describe that major structures and functions of tissues

**Labs/Activities**

- Levels of organization
- Cell membrane lab
- Osmosis in Carrot tissue
- Microscope lab/tissue

**Unit 4 Skin & Membranes**

a) Classification of body membranes; name the location of membranes
b) Integumentary system: describe how the layers of the integumentary system function
c) understand our differences in pigmentation based on ancestral evolutionary pressure and how it relates to ethnicity.
d) explain how errors in mitosis or environmental pressure can lead to skin cancer.

**Labs/Activities**

- Integumentary system lab/Orange peel
- Sutures lab
- Burn lab
- Haspi Skin Cancer lab
- Skin project (presentation)

**Unit 5 - Skeletal System** Bones

a. Identify the different types of bones in the human body
b. Name the major bones of the skeletal system
c. List the different functions of the skeletal system
d. Compare axial vs appendicular bones
e. Name major joint categories
f. Describe the motions allowed by each joint
g. Identify different types of breaks in bones
h. Describe bone formation in the fetus

**Labs/Activities**

- Bone growth and remodeling
- Busy Bones Lab
- Osteoporosis lab
- Building Skeletal parts
- Examining fractures
- Bone yard/archeological dig sites

**Unit 6 Muscular System**

a) Compare three types of muscle: skeletal & smooth & cardiac
b) identify the different structures that make up the skeletal muscle: endomysium, perimysium, fascicle, tendons, aponeuroses
c) Muscle movements, types, and names: use the skeletal muscles to move particular bones
d) Explain the role of actin and myosin myofilaments
e) Describe the events of muscle contraction

**Labs/Activities**

- Muscle movements lab
- Workout routine
- Muscle fatigue lab
- Mink Dissection

**Unit 7 - Nervous System**

a) Organization of the nervous system: describe the pathway from Stimuli to efferent outcomes with the various structures the CNS and PNS
b) Nervous tissue: describe neurons (different types/ structures) with different functions and the nerve impulse
c) Central nervous system: locate and describe the basic structure and function of the brain and spinal cord.
d) Peripheral nervous system: describe the relationship between the nervous system and other parts of the body.
e) Define the reflex arc and its elements
f) Explain the importance of the spinal cord
g) Compare parasympathetic and sympathetic divisions in the heart, lungs, digestive system, and blood vessels

**Labs/Activities**

- Reflex Lab
- Action Potential
- Neuron Model
- Brain Damage
- Brain dissection

**Unit 8- Senses**

a) Eye: identify basic structures and functions of the eye
b) Ear: identify basic structure and functions of the ear c describe the location, structure, and function of the olfactory and taste receptors

**Labs/Activities**

- Eye lab
- Senses lab
- Eye dissection
- Taste lab

**Unit 9 Endocrine System**

a) Hormone function: explain functions hormones and how they help to regulate homeostasis
b) Major endocrine organs: locate organs and explain how they interact with other systems c explain how hormones help to maintain homeostasis in the body
c) List the hormones produced by the endocrine gland and their functions

**Labs/Activities**

- Glands skit
- Commercial

**Unit 10 Cardiovascular & Blood System Unit 11**

a) Composition and functions of blood: identify the types of blood cells and basic functions
b) Blood groups: describe how molecules in various Blood Groups are different and which blood groups are compatible for Transfusions
c) Anatomy of the heart: locate major parts of the heart
d) Physiology of the heart: Identify the electrical conduction of a cardiac cycle and identify the effects on blood pressure

**Labs/Activities**

- Blood typing lab

- Blood pressure
- Heart rate lab
- Complete Blood Count lab
- Heart Model

**Unit 12 Lymphatic System**

a) Explain how the structure of the Lymphatic vessels, nodes, organ structure helps with the function
b) Nonspecific body defenses: describe when those defenses are used.
c) Specific body defenses: Immune System: describe when those defenses are used.
d) Diagram an inflammatory response
e) Explain how a fever helps protect the body
f) Describe the roles of B cells and T cells
g) Compare active and passive immunity

**Labs/Activities**

- Hand washing experiment
- Covid vaccines
- Herd immunity
- Antibiotic resistance
- Immune system cartoon

**Unit 13 Respiratory System**

a) Functional anatomy of the respiratory system
b) Respiratory physiology: describe how breathing mechanics helps transfers macromolecules (cellular respiration)
c) Explain how homeostasis is regulated with the muscular system and nervous system
d) Compare external vs internal respiration
e) Define and model lung capacity

**Labs/Activities**

- Lung model
- Lung capacity lab
- Mink dissection

**Unit 14 Digestive System**

a) Anatomy of the digestive system: identify major organs and which enzymes are used
b) Functions of the digestive system: describe the organs/ enzymes/ micromoles in each of the processes of digestion, absorption, and elimination
c) Nutrition: describe how different nutrients play a role in homeostasis.
d) Compare: anabolic, catabolic and metabolic

**Labs/Activities**

- Haspi digestion lab
- Enzyme lab
- carb/proteins/fats
- Gizmos:
- Digestion lab
- Mink Dissection

**Unit 15 Urinary System**

a) identify major organs: Kidney, ureters, urinary bladder, and urethra in urination and match with their basic functions.
b) Explain how urine is produced in the nephrons
c) Explain how Fluid, electrolyte, and acid-base balance in with homeostasis

**Labs/Activities**

- Urinalysis lab
- Gizmos:
- homeostasis stem lab
- kidneys

**Unit 16 Reproductive System**

a) Identify the major structure of the male and female reproductive system and explain their functions.
b) Explain how the Female reproductive functions and cycles
c) Explain main steps of pregnancy and embryonic
d) Development from embryo to fetus to baby
e) Explain the roles of hormones in male and female reproductive system
f) Explain the progression/stages of labor
g) Describe how pregnancy changes a women's body

**Labs/Activities**

- Fetal development - HASPI lab
- Fetal model
- Case studies: sex characteristics

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

**LMC Course-Level Student Learning Outcomes (CSLOs):**

By the end of this course, the student should 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. GRADING POLICY:**

Grades are based on a point system.

| | |
|---|---|
| A | 90% - 100% |
| B | 80% - 89% |
| C | 70% - 79% |
| D | 60% - 69% |
| F | 59% and below |

Assignments WILL include:

| | |
|---|---|
| Homework | 10% of grade |
| Labs/Research/Projects | 30% of grade |
| Practicums | 30% of grade |
| Assessments/Quizzes | 30% of grade |

**H. TEXTBOOKS OR OTHER SUPPORTING MATERIALS**

- Elaine N. Marieb, *Essentials of Human Anatomy & Physiology* 8th edition
- Science classroom equipment
- Specimens for dissection.

**I. 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** 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 Introduction to Anatomy & Physiology at Pittsburg High School 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 CCCCD (California Community College District) transcript the units of credit for LMC's **BIOSC-030 Introduction 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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**COLLEGE SIGNATURES**

Natalie Hannum
Natalie Hannum (Nov 7, 2022 11:39 PST)

Natalie Hannum — Date
LMC Vice President of Instruction

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

Ryan Pedersen — Date
LMC Dean of Instruction Math & Physical Sciences

Kyle Hanks
Kyle Hanks (Nov 1, 2022 13:57 PDT)

Kyle Hanks — Date
LMC Biology Department Chair

James Clark — Date
LMC Faculty

**HIGH SCHOOL/ROP/DISTRICT SIGNATURES**

Todd Whitmire
Todd Whitmire (Nov 7, 2022 14:02 PST)

Todd Whitmire — Date
PHS Principal

Anthony Molina
Anthony Molina (Jan 21, 2023 09:34 PST)

Anthony Molina — Date
PUSD Executive Director of Educational Services

Birdie Forsythe
Birdie Forsythe (Nov 12, 2022 09:22 PST)

Birdie Forsythe — Date
PHS Faculty

Stephanie Quintana
Stephanie Quintana (Nov 14, 2022 09:14 PST)

Stephanie Quintana — Date
PHS Faculty