

## SYLLABUS

**NAME OF COURSE:** Systemic Physiology – PHYS-122

**LENGTH OF COURSE:** 3.5 units, 55 hours (5 hrs/lecture)

**COURSE DESCRIPTION:** This course investigates the functioning of the human body at the cellular, organ, system, organismal levels. The role of major physiological systems in maintaining homeostasis will be studied. The laboratory involves an introduction to instrumentation such as EEGs, EMGs, ECGs, Spirometry, and Metabolism used to measure and study physiological parameters. Students are introduced to methods of collection and analysis of data, and preparation of laboratory reports.

**PREREQUISITE:** PHYS-115, ANAT-110

**COURSE OFFERED BY:** Basic Sciences Department

**REQUIRED TEXTS:** Systemic Physiology Lecture Class Notes and PPTs

**RECOMMENDED TEXTS:** (All Texts below are available in library)

Marieb EN. *Essentials of Human Anatomy & Physiology*. 10<sup>th</sup> ed. 2010: ISBN-10: 0321695984 | ISBN-13: 978-0321695987

Tortora GJ. and Derrickson BH. *Principles of Anatomy and Physiology* 13<sup>th</sup> ed. 2011: ISBN-10: 0470565101 | ISBN-13: 978-0470565100

Guyton AC. and Hall JE. *Textbook of Medical Physiology*. 12<sup>th</sup> ed. 2010: ISBN-10: 1416045740 | ISBN-13: 978-1416045748

**METHODS OF INSTRUCTION:** Lecture, overhead projector, videos, models

**GRADING:** There will be two midterms and a final exam. Each midterm and final exam is worth 100 points of the lecture grade. In addition an opportunity to participate in Journal Article review and critical analysis to **substitute** as 10% of test scores will be offered.

Under usual circumstances THERE WILL BE NO MAKE-UP EXAMS UNLESS THE INSTRUCTOR AND STUDENT HAVE MADE PRIOR ARRANGEMENT!

Grades will be assigned according to the following scale:

A - 4.0	100- 90%
B - 3.0	89 - 80%
C - 2.0	79 - 70%
F – 0.0	Student must repeat the entire course

**Grades and the Grading System Final Grades** are available online through the CAMS student portal. If there are any questions on grading procedures, computation of grade point average, or the accuracy of the grade report, please contact the Registrar's Office or the Office of Academic Affairs. Grades will be reported and evaluation will be based on the Academic Policies, Procedures, & Services. Please refer to Evaluation Policy (**Policy ID: OAA.0007**)

In order to maintain **Satisfactory Academic Progress**, a student must maintain a 2.0 or better in each and every course. **Any grade less than a C must be remedied by repeating the class.** Please refer to Satisfactory Academic Progress (**Policy ID: OAA.0006**)

**Attendance:** Please refer to Attendance Policy (**Policy ID: OAA.0002**)

#### **Conduct and**

**Responsibilities:** Please refer to the Personal Conduct, Responsibility and Academic Responsibility Policy (**Policy ID: OAA.0003**)

**Make-up Exams:** Please refer to Make-up Assessment Policy (**Policy ID: OAA.0001**)

#### **Request for**

**Special Testing:** Please refer to Request for Special Testing (**Policy ID: OAA.0004**)

#### **Accommodation**

##### **for Students with Disabilities:**

If you have approved accommodations, please make an appointment to meet with your instructor as soon as possible. If you believe you require an accommodation, but do not have an approved accommodation letter, please see the Academic Counselor Lori Pino in the Office of Academic Affairs. Contact info: [Lpino@lifewest.edu](mailto:Lpino@lifewest.edu) or 510-780-4500 ext. 2061. Please refer to Service for Students with Disabilities Policy (**Policy ID: OAA.0005**)

#### **Electronic Course Management:**

**Canvas** is LCCW's Learning Management System (LMS). Canvas will be used throughout the quarter during this course. Lectures, reminders, and messages will be posted. In addition, documents such as the course syllabus and helpful information about the class project will be posted. Students are expected to check Canvas at least once a week in order to keep updated. The website address for Canvas is <https://lifewest.instructure.com/login/canvas> Please refer to the Educational Technologies Policy (**Policy ID: OAA.0009**)

#### **COURSE GOALS:**

The goal of this course is to provide the student with a level of knowledge and understanding of the Physiological Systems of the body (Nervous Sys, Special Senses, Cardiovascular Sys, Musculoskeletal Sys, Respiratory Sys, Urinary Tract Sys, and Digestive Sys) to prepare them for more advanced and focused courses of the pre-mentioned systems.

## **COURSE OBJECTIVES:**

### **Week 1: Mechanisms of Homeostasis; Review of Cellular Physiology**

- To explain the three components of homeostatic mechanisms
- To describe examples of homeostasis
- To discuss examples of homeostatic imbalance, the symptoms and treatments for these pathological conditions

### **WEEK 2: Membrane potentials; action potentials; neurons**

- To explain how membrane potentials are generated and measured
- To describe how the membrane potentials of particular cells can change
- To list the components of the action potential and how they are generated (i.e., movement of which ions in which direction are responsible for which component)
- To define IPSP, EPSP, receptor potential, end-plate potential
- To define and explain various forms of regulation and neuromodulation
- To discuss how conduction velocities are related to neuron diameter and myelination

### **WEEK 3: Neurotransmitters; types of synapses/receptors; introduction to central nervous system anatomy and physiology**

- To List the classes of neurotransmitters
- To differentiate between direct and indirect neurotransmitters/synapses/receptors
- To describe the characteristics of post-synaptic receptors
- To give examples of locations of specific types of synapses
- To discuss how agonists and antagonists are related to CNS functions
- To describe the embryological development of the human brain
- To discuss the general anatomy and functions of the following brain areas: cerebral cortex; lobes; Brodmann's Areas; Broca's Area; Wernicke's area, cerebellum; basal ganglia; pituitary; hypothalamus; limbic system; ventricles; corpus callosum; brainstem
- To discuss symptoms and treatments of neurological disorders highlighted during class

### **WEEK 4: Sensory Physiology: Cutaneous; Taste; Olfaction**

- To describe the characteristics of cutaneous receptors
- To explain how cutaneous sensation is transmitted and processed in the CNS
- To discuss how cutaneous sensations can be increased or decreased
- To describe the structure and arrangement of taste buds
- To discuss how taste sensation is transmitted through cranial nerves to the CNS
- To describe the arrangement of receptors in olfactory epithelium
- To trace the neural pathways of olfaction in the brain
- To discuss the similarities and differences among sensory systems

### **WEEK 5: Sensory Physiology, continued; Hearing; Vision**

- To describe the anatomy of the outer, middle, and inner ears (including the cochlea, organ of Corti, and basilar membrane)
- To discuss the different types and causes of hearing loss and available treatments
- To describe the anatomy of the eye, (including the cornea, the lens, the iris, the retina, the optic disk, the fovea and macula)
- To explain the differences in anatomy, function, and distribution between rod and cone cells
- To discuss different types and causes of vision dysfunctions and available treatments
- To trace the transmission of visual inputs from the retina to visual cortex

### **WEEK 6: Muscle Physiology**

- To describe the anatomical and functional differences among skeletal muscle cells, myocardial cells, and smooth muscle cells
- To describe the composition of thin and thick filaments and the components of sarcomeres in striated muscle cells
- To explain the mechanisms of contraction of skeletal muscle cells, myocardial cells, and smooth muscle cells
- To discuss differences in Creatine Phosphate, Anaerobic Respiration and Aerobic Respiration
- To discuss muscle fatigue in different fiber types and oxygen debt

### **WEEK 7: Circulatory Physiology**

- To trace the circulation of blood through the heart
- To discuss how the events of the cardiac cycle correspond to heart sounds and ECG waves
- To discuss some of the common dysfunctions or abnormalities that can occur during the cardiac cycle and available treatments for same
- To discuss Cardiac Output (Preload, Afterload, Contractility and Principles of Starling's Law)
- To discuss systemic circulation and short term/long term mechanisms of regulation and control

### **WEEK 8: Respiratory Physiology**

- To trace the flow of air through the conducting zone to the respiratory zone of the lungs
- To describe the mechanisms of quiet and forced inspiration and exhalation
- To discuss pressure relationships in breathing (Boyle's Law)
- To discuss concepts of airway resistance, lung compliance and respiratory volumes
- To discuss the principles and physics of gas exchange in the respiratory system
- To discuss the principles of external and internal respiration
- To discuss the principles of transport of respiratory gases and oxygen dissociation
- To discuss control of respiration
- To discuss obstructive and restrictive problems in breathing

### **WEEK 9: Renal Physiology**

- To trace and list mechanisms of renal filtration
- To discuss levels of passive glomerular filtration
- To discuss role of blood pressure and formation of GFR
- To discuss regulation of glomerular filtration
- To discuss and trace the flow of filtrate through the nephron
- To discuss the formation and mechanisms used to concentrate or dilute urine
- To discuss Micturition reflex

### **WEEK 10: Digestive System**

- To list the levels of the digestive system
- To discuss the difference between mechanical and chemical digestion
- To discuss the mechanisms of digestion occurring in the Mouth and teeth formation
- To discuss the mechanisms of digestion in the stomach
- To discuss the mechanisms of digestion in the small intestine
- To discuss the role of the liver in digestion and metabolism
- To discuss the role of the pancreas in digestion and metabolism
- To discuss the mechanisms in the large intestine and the role of natural flora
- To discuss the defecation reflex

### **STUDENT LEARNING OUTCOMES:** At the completion of Sys Phys 122 course:

1. The student will be able to understand and apply the basic principles of homeostasis with regards to the human body [PLO 1,3,4,6,8]
2. The student will be able to understand apply the basic principles of neurophysiology [PLO 2,3,4]
3. The student will be able to demonstrate competency in understanding the different areas of function in the brain and how they would be affected by homeostatic imbalances such as stroke or lesion [PLO 1,2,3]
4. The student will demonstrate a basic understanding of neurotransmitter types and function [PLO 4,6,10]
5. The student will demonstrate a basic understanding of how the different senses function and relay information to the brain [PLO 1,2,3]
6. The student will demonstrate an understanding of the different muscle groupings and how they function [PLO 1,2,3,6,8, 10]
7. The student will demonstrate an understanding of cardiovascular function, regulation and anatomy [PLO 1,2,3,4,5,10]
8. The student will demonstrate an understanding of respiratory physics, mechanisms of gas transport and disassociation [PLO 1,2,3,4,5,6,10]
9. The student will demonstrate a working knowledge of the different parts of the digestive system and how they function [PLO 1,2,3,4,5,6,8,10]
10. The student will demonstrate a basic understanding of metabolism [PLO 1,2,3,4,8]

**Program Learning Outcomes (PLO):** Students graduating with a Doctor of Chiropractic degree will be proficient in the following:

1. **ASSESSMENT AND DIAGNOSIS:** An assessment and diagnosis requires developed clinical reasoning skills. Clinical reasoning consists of data gathering and interpretation, hypothesis generation and testing, and critical evaluation of diagnostic strategies. It is a dynamic process that occurs before, during, and after the collection of data through history, physical examination, imaging, laboratory tests and case-related clinical services.
2. **MANAGEMENT PLAN:** Management involves the development, implementation and documentation of a patient care plan for positively impacting a patient's health and well-being, including specific therapeutic goals and prognoses. It may include case follow-up, referral, and/or collaborative care.
3. **HEALTH PROMOTION AND DISEASE PREVENTION:** Health promotion and disease prevention requires an understanding and application of epidemiological principles regarding the nature and identification of health issues in diverse populations and recognizes the impact of biological, chemical, behavioral, structural, psychosocial and environmental factors on general health.
4. **COMMUNICATION AND RECORD KEEPING:** Effective communication includes oral, written and nonverbal skills with appropriate sensitivity, clarity and control for a wide range of healthcare related activities, to include patient care, professional communication, health education, and record keeping and reporting.
5. **PROFESSIONAL ETHICS AND JURISPRUDENCE:** Professionals comply with the law and exhibit ethical behavior.
6. **INFORMATION AND TECHNOLOGY LITERACY:** Information literacy is a set of abilities, including the use of technology, to locate, evaluate and integrate research and other types of evidence to manage patient care.
7. **CHIROPRACTIC ADJUSTMENT/MANIPULATION:** Doctors of chiropractic employ the adjustment/manipulation to address joint and neurophysiologic dysfunction. The adjustment/manipulation is a precise procedure requiring the discrimination and identification of dysfunction, interpretation and application of clinical knowledge; and, the use of cognitive and psychomotor skills.
8. **INTERPROFESSIONAL EDUCATION:** Students have the knowledge, skills and values necessary to function as part of an inter-professional team to provide patient-centered collaborative care. Inter-professional teamwork may be demonstrated in didactic, clinical or simulated learning environments.
9. **BUSINESS:** Assessing personal skills and attributes, developing leadership skills, leveraging talents and strengths that provide an achievable expectation for graduate success. Adopting a systems-based approach to business operations. Networking with practitioners in associated fields with chiropractic, alternative medicine and allopathic medicine. Experiencing and acquiring the hard business skills required to open and operate an on-going business concern. Participating in practical, real time events that promote business building and quantifiable marketing research outcomes
10. **PHILOSOPHY:** Demonstrates an ability to incorporate a philosophically based Chiropractic paradigm in approach to patient care. Demonstrates an understanding of both traditional and contemporary Chiropractic philosophic concepts and principles. Demonstrates an understanding of the concepts of philosophy, science, and art in chiropractic principles and their importance to chiropractic practice.