

## SYLLABUS

**NAME OF COURSE:** Cell Physiology – PHYS-115

**LENGTH OF COURSE:** 3 units, 44 hours (4 hours theory session/week)

**COURSE DESCRIPTION:** The structure and function of the cell and all its organelles are described, illustrating how life processes in the cell are reflected in the functioning of the whole body. Topics covered in detail are the structure and function of cell membranes, transport of material across membranes, protein structure and function, motility in cells (microfilaments and microtubules), carbohydrates and cellular respiration, ATP, nucleic acids, protein synthesis, mitosis, and meiosis.

**PREREQUISITES:** NONE

**COURSE OFFERED BY:** Basic Sciences Department

**REQUIRED TEXT:** Marieb EN, Human Anatomy & Physiology, Any Edition

ISBN-10: 0321695984 | ISBN-13: 978-0321695987

**RECOMMENDED TEXTS:** Hardin j. Becker's *The World of the Cell*. Any Edition

ISBN-10: 0321716027 | ISBN-13: 978-0321716026

### **METHOD OF INSTRUCTION:**

Lecture and PowerPoint presentations centered on topics related to the course contents.

### **EVALUATION:**

**Grades:** Grade is based on 2 written 40 question midterm examinations worth 40 points each, and a final exam worth 80 points. Exams may be a combination of objective (multiple-choice, true/false, and matching) and/or short essay questions. The letter grade corresponds to an adjusted percentage of points earned. Because quarter instructional hours vary due to holidays or special events, the instructor may expand or reduce the length of the final exam to accommodate this situation. The final exam will be comprehensive in nature and include both material covered since the last exam and cumulative material.

## **Grades and Method of Grading:**

The final grade will be based on the following scale:

|   |                            |           |
|---|----------------------------|-----------|
| A | 4.0 Superior work          | 90 - 100% |
| B | 3.0 Above Average          | 80 - 89%  |
| C | 2.0 Average Work           | 70 - 79%  |
| F | 0.0 Must repeat the course | 00 - 69%  |

**Grades and the Grading System Final Grades** are available online through the CANVAS/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 (**PolicyID: OAA.000**)

## **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 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 OBJECTIVES:**

### **Week 1**

- Review basic chemistry; learn the chemical components of the cell, understanding how they are assembled to form the structure of cell membranes and organelles.

### **Week 2 - 3**

- Define and describe metabolism, and related concepts such as anabolism, catabolism, exergonic and endergonic reactions, oxidation and reduction.

### **Week 4**

- Review and/or Finish week 1 - 3 material
- **Assessment One: Midterm One**

### **Week 5 - 6**

- Describe the structure and function of the phospholipid bilayer in cell membranes.
- Differentiate between active, passive and facilitated transport across membranes and to cite several examples of each, relating these examples to cellular functions such as nutrition or conduction of nerve impulses.
- Explain that the energy source for active transport can be supplied either from ATP or else from the exergonic (passive) movement of another molecule or ion.

### **Week 7**

- Describe different types of cell junctions involved in joining cells to form tissues.
- Compare the similarities and differences in the structure and function of the cytoskeleton and its components.

### **Week 8**

- Describe organelle structure and function (Rough and Smooth ER, Golgi Complex, Nucleus, Mitochondria, Peroxisomes, and Lysosomes)
- Describe the structure of ATP, defining its components, and explaining why the cell needs to make ATP.
- **Assessment Two: Midterm Two**

### **Week 9**

- Describe the reactions of glycolysis, the Krebs cycle and electron transport chain, explain the purpose of these pathways in the economy of the cell, and distinguish the difference between substrate-level phosphorylation and oxidative phosphorylation.
- Describe the structure of DNA and RNA, identifying all the purines and pyrimidines, to be familiar with the double helix of DNA, base-pairing of complementary strands, use of templates, antiparallel strand orientation, B-DNA and Z-DNA, and different levels of coiling of the DNA with histones, to form chromosomes.

### **Week 10**

- Define transcription, translation, and replication; explain where, why and how each of the processes occurs in the cell.
- Describe the events of each phase of mitosis, meiosis, and binary fission

### **Week 11 - Assessment: Final Exam**

## **STUDENT LEARNING OUTCOMES:**

**This course aligns to PLOs: (1 and 3)**

1. The student will be able to describe the chemical structure of the cell and cell membrane.
2. The student will be able to explain the mechanisms of cellular transport, cellular junctions, and signaling methods.
3. The student will be able to describe cellular metabolism.
4. The student will be able to describe the cellular organelles and their functions.
5. The student will be able to explain the mechanism of cell division, basic cellular genetics, protein synthesis and basic mechanisms of regulation at a genetic and protein level.

**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 require 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.