BIO 3100 (*Cellular Biochemistry*) section 31707
Course Syllabus *Spring* Semester, *2019*

Instructor: Eduardo Palomino, Ph.D.
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TEXTBOOK : **Lehninger, Principles of Biochemistry, 7th edition**
CLASS LOCATION AND TIME: 010 Prentis M, W 11:30AM – 2:00 PM
OFFICE HOURS: by arrangement.

CREDITS AND PREREQUISITES: This is a 3 credit course. Grade of C or better in BIO 2200 & 2600, CHM 1220, 1230, 1240, 1250 or CHM 1410 are required.

COURSE DESCRIPTION: This course will provide an introduction to the composition and function of bioorganic compounds. The objective is to familiarize the student with the works of proteins, lipids, carbohydrates and other bio-molecules in living systems**.**

LECTURES: Presentations for lectures are comprehensive, follow the textbook and other sources and serve as a study guide. All lectures will be video captured and are available on Canvas Echo Center

Three regular **EXAMS** worth 60 points will be given the first hour of the designated day and a comprehensive 2h **FINAL** worth 70 points given on Monday June 24. One exam, not the final, will be dropped and at least 10 open pop quizzes each worth 1 point will be given during any lecture to complete 200 points. **FORMAT** of exams is multiple choice. There are no make-up exams.

SCHEDULE

Session	Subject and Exams
5/6 - 13	Phase1-2
5/15 (**W**)	**Exam 1**
5/15– 22	Phase 2
5/29 (**W**)	**Exam 2**
5/31 (F) class. Replaces the lecture of Monday 27 (Memorial day)	
5/29, 31 – 6/5	Phase 2-3
6/10 (**M**)	**Exam 3**
6/10 – 6/19	Phase 3-4
6/24 (**M**) **11:30–1:30**	**Final Exam**

Recording: Posted after each class on Blackboard (Echo).

GRADING: Based on 200 points total (the number refers to the low end of the letter grade)
A 184, A- 176, B+ 168, B 160, B- 152, C+ 144, C 136, C- 128, D+ 120, D 112, D- 104, F below 104. Grades deliver on canvas within 72h.

OVERALL TOPICS OF PRESENTATIONS

Phase 1
The cell, organelles, membrane composition, macromolecules introduction: proteins, carbohydrates, nucleic acids and triglycerides; physical and chemical foundation: osmosis, functional groups, water and noncovalent interactions, acids, bases and buffers, pH and pI, Energy and thermodynamics, ATP and its energy, redox reactions. Amino acids and proteins: properties and functions.

Phase 2
Enzymes and coenzymes: properties, reactions and regulation. Carbohydrates classification and reactions. Glycoconjugates and blood types. Nucleic acids: DNA and RNA fundamentals. Cloning single genes, PCR. Lipids: storage triglycerides, membrane lipids and sphingolipids. Steroids, eicosanoids, isoprenoids and oleo-soluble vitamins. Biological membranes composition and membrane transport: diffusion, facilitated transport and active transport. Signal transduction

Phase 3
Biochemical reactions. Glycolysis, gluconeogenesis and the pentose phosphate pathway. Glycogen metabolism, citric acid and glyoxylate cycles. Fatty acid and aminoacid catabolism. The urea cycle. Oxidative phosphorylation and photophosphorylation

Phase 4
Carbohydrate biosynthesis. Biosynthesis of fatty acids, eicosanoids and steroids. Biosynthesis of some aminoacids. Introduction to hormones and hormonal regulation. DNA, RNA and protein synthesis

SKILLS AND ACTIVITIES

Students will learn the following skills in general and honors section of the class:

General section

- Concept of hypothesis
- Formulation of questions and designing of experiments to test hypothesis
- Analytical skills
- Problem solving skills

Honors section

- Searching the literature for pertinent information on a selected topic
- Reading of research papers and developing an understanding of the central concept of research findings
- Ability to present ideas in the form of oral and/or written presentation

LEARNING OBJECTIVES

- A solid understanding of the chemistry of life and the central role that laws of thermodynamics play in living systems
- An understanding of the structure of biomolecules
- An understanding of the physiological function of major biomolecules
- Understanding of the concept of the structure-function relationship: how the structure of biomolecules allow them to perform their assigned cellular function
- Introduction to the metabolism of major biomolecules and the principles that govern them; integration of metabolism
- Introduction of the concept of information pathways within a cell: emphasizing the basic principles of enzymology and gene expression
- The course material should provide students with a foundation for subsequent studies in upper level disciplines in Biology

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GRADE DISPUTES: Students will have one (1) week after the exam to challenge a grade.

CHEATING: A strict zero-tolerance policy for cheating will be enforced. Anyone caught cheating on an exam will receive a score of 0 (zero) for that portion of the grade.

DISABILITIES: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only).

UNEXPECTED CLOSURES: If the University is officially closed on an exam day, the exam will be held on the next regularly scheduled class day.

RELIGIOUS CONFLICTS: Any conflicts with religious protocol will be arranged by the instructor on individual basis.