

BIO 3100 (*Cellular Biochemistry*) section 31707 **Course Syllabus *Spring* Semester, 2017**

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TEXTBOOK : Lehninger, *Principles of Biochemistry*, 6th edition

CLASS LOCATION AND TIME: 234 State 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 extracted from the textbook and other sources and posted on Blackboard. The Presentations serve as a study guide but because they are not comprehensive in their explanations, the student is required to use the explanations given in the lecture and/or in the book for preparation of exams. All lectures will be video captured and will be available in the Echo Center

Three **1 h EXAMS** worth 40 points each, four **15 min. QUIZZES** worth 10 points each (equivalent to 1 exam) and a **FINAL** worth 80 will be given on designated days. One exam, not the final, will be dropped for a total of 200 points. Final is semi-comprehensive involving material covered in the 4 exams plus the latest presentations. **FORMAT** of exams is multiple choice. There are no make-up exams and no curve.

SCHEDULE of Exams and quizzes

<u>Date</u>	<u>Quizzes and Exams</u>
5/10 W	Quiz 1, 15 min
5/15 M	Exam 1, 1h
5/24 W	Quiz 2, 15 min
5/29 M	Exam 2, 1h
6/7 W	Quiz 3, 15 min
6/12 M	Exam 3, 1h
6/21 W	Quiz 4, 15 min
6/26 M	Final exam, 2h

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 posted ~72h after at <http://www.blackboard.wayne.edu>

OVERALL SEQUENCE OF PRESENTATIONS

The chemistry of Biochemistry

A review of organic chemistry as apply to biological systems. **Biochemical reactions**, as opposed to simple chemical ones will be presented along with the functional groups, showing the mechanistic differences between the two. Since biochemical reactions use different reactors, the study of **aminoacids** and **proteins** will be presented alongside showing the importance of **enzymes** and **cofactors** in these processes. Emphasis will be given to enzyme classification highlighting the differences between redox and substitution reactions. Enzymatic active site and mechanism will be study with emphasis on individual players: the aminoacids.

Membranes of the cell, cell receptors and transporters

Lipids relevant to cell and organelles' membranes will be analyzed alongside the proteins that constitute the **transporters** and **receptors** critical to **signal transduction**.

The design of proteins: from DNA to translation

Chemistry of polynucleotides in DNA and RNA ends in the synthesis of the critical proteins. Protein modifications and delivery. Protein catabolism and the urea cycle

The energetics in cell function

Carbohydrates and fats as source of energy. Glycolysis, beta oxidation, Krebs and glyoxylate cycles. Fat anabolism.

ATP and the storage of energy

Synthesis of high energy containing compounds. Conversion of electric to chemical energy: the respiratory chain. Photophosphorylation

Special topics

Vitamins, collagen, muscle and nerve function

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. Closure of the University is announced by the following mechanisms: 1) University Newline (313) 577-5345 2) WSU Homepage (www.wayne.edu) 3) WSU Pipeline (www.pipeline.wayne.edu) 4) WDET-FM (Public Radio 101.9) 5) by other local radio and television stations.