



# INTRODUCTION TO BIOCHEMISTRY

## CHEM 220

### Course Description

This course provides students with a basic understanding of the biomolecules involved in the molecular architecture of eukaryotic cells and organelles. The course also describes the structural and functional properties of different biomolecules (carbohydrates, proteins, and lipids), the principles of bioenergetics, concepts of enzymology, and nutritional biochemistry.

**Credit: 3 credits**

**Repeatable: No**

### Course Structure

The course will be presented in different formats: Lectures with PowerPoints, self-directed learning, discussions and student assignments etc.

### Competencies

This course emphasizes competencies to enhance skills essential for a future health care professional.

- Knowledge
  - **Demonstrate content knowledge and skills in foundational courses required by biomedical professionals**
  - **Demonstrate information literacy**
  - Demonstrate quantitative reasoning
  - **Demonstrate longitudinal learning through coursework**
- Critical Thinking
  - **Develop the skills of self-reflection and peer assessment to improve personal performance.**
  - **Demonstrate the ability to analyze literature and written material**
  - **Demonstrate the ability to distinguish between well-reasoned and poorly reasoned arguments**
- Communication Skills
  - **Demonstrate effective presentation skills to faculty and peers.**
  - **Demonstrate effective listening skills**
  - **Demonstrate effective written communication**

**Objectives:**

Upon completion of CHEM 220 course, the student should be able to describe:

- Basic concepts of the biomolecules and its role in cells.
- Basic concept of carbohydrate structure and their chemical properties.
- Basic concept of lipid structure and their chemical properties.
- Basic concept of amino acids structure and their chemical properties.
- General concept of protein structure and their chemical properties.
- Functions of enzymes and how the enzymes activates any reactions in different biochemical pathways.
- Role of energy and nutrients including vitamins in our body.
- The concepts of bioenergetics and the production of energy by electron transport chain and oxidative phosphorylation.
- Concept of digestion and absorption of carbohydrates in human.
- Concept of universal carbohydrate metabolic pathway the glycolysis.

**Schedule:** Dates and times to be posted at the beginning of the term on the online calendar.

**Course Topics / Outline**

Activity #	Lecture Topics
Week1	Introduction of Biochemistry
Week 2	Carbohydrates
Week 3	Lipids
Week 4	Amino acids, <b>Quiz 1</b>
Week 5	Proteins
Week 6	Enzymes, <b>Quiz 2</b>
Week 7	<b>Mid-Term Exam</b>
Week 8	Nutritional Biochemistry/ Vitamins overview
Week 9	<b>Vitamin presentations (Assignment)</b>
Week 10	Bioenergetics, Electron Transport Chain & Oxidative Phosphorylation
Week 11	<b>Quiz 3</b> , Digestion and absorption of carbohydrates
Week 12	Glycolysis
Week 13	Pre Examination Review
Week 14	<b>Final Examination</b>

**Assignments:**

Students required to present the overview of one vitamin and select some research articles to add knowledge related to benefits or toxicity of chosen vitamin. The Presentation time is 20 minutes and the students required to submit the power-point 24 hours before the presentation schedule.

## Textbooks and Reference Materials:

### Required Texts

Denise Ferrier. Lippincott's Illustrated Reviews: Biochemistry. 7<sup>th</sup> Edition. Publisher: LWW.

### Recommended Texts

Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. Harper's Illustrated Biochemistry. 31<sup>st</sup> Edition. Publisher: McGraw-Hill Education.

**Evaluation:** Students are evaluated by three quizzes, a midterm exam, a final exam, assignments and their attendance.

### Points:

	Points*
Assignments	10%
Quizzes	25%
Mid Term	30%
Final exam	30%
Attendance	5%
Total points	100%

\*Points are approximate and may be adjusted during the term. Students will be notified of changes.

### Grade:

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

### Attendance:

Students are expected to attend at least 80% of all scheduled learning activities. Attendance in the class will be recorded. Students attended 80% or more will be awarded with 5% on total scoring system. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences if informed respective faculty or the Dean of Students.

### Policies:

#### Professional Demeanor

The student should be thoughtful and professional when interacting with faculty and other students. Inappropriate behavior includes the use of offensive language, gestures, or remarks with sexual overtones. Students should maintain a neat and clean appearance, and dress in attire that is generally accepted as professional.

## Honesty

Students are expected to demonstrate honesty and integrity in all aspects of their education and in their interactions with faculty, administration, physicians, patients, and fellow students. They will not cheat, plagiarize, or assist others in the commission of these acts.

## **Faculty and Office Hours:**

Dr. Miguel Miyares, Professor and Course Director

Dr. Manish Mishra, Associate Professor

Student can schedule an appointment by email to respective faculty.