UNIVERSITY OF CINCINNATI
MCMICKEN COLLEGE OF ARTS & SCIENCES
DEPARTMENT OF CHEMISTRY

Course number:	**CHEM3040**
Course name:	**INTRODUCTION TO BIOCHEMISTRY**
Class:	41129
Lecture Room:	Rieveschl 502
No. of credits:	3
Faculty:	Bala Addepalli
Office:	429F Rieveschl
E-mail:	balasual@ucmail.uc.edu (***best way to contact***)
Class hours:	Tuesday and Thursday 11:00 AM to 12:20 PM
Office hours:	Wed 10:00 to 12:00 noon or by appointment

Course Description:

Biochemistry is an exciting, interdisciplinary science and research of growing importance for several career fields. This introductory course is designed to understand and evaluate the physico-chemical basis of the structure, function and informational capacity of *bio-organic molecules* (or simply *biomolecules*) found in the living systems. The topics of discussion revolve around *understanding and analyzing* what these biomolecules are, *their properties, structure-function relationships*, how they *carry out biochemical reactions* associated with life processes, and how even small perturbations, sometimes, can affect their function.

The attendees are expected to possess basic background of introductory organic chemical nomenclature, and cell ultra-structure.

Course Learning Outcomes:

After successful completion of the course, you will be able to

1. Explain the characteristics of various *classes of biomolecules* present in living organisms in *physical and chemical* terms.
2. Demonstrate how *structure affects function*, and how key structural alterations can impact overall function of the cell.
3. Understand *bioanalytical and bioinformatics techniques* employed to characterize and *infer the evolution* of biomolecules.
4. Illustrate how *cells elicit response to external stimuli* such as hormones.

Textbook

The **required textbook** for this class is online version of *Lehninger Principles of Biochemistry* ***Ebook w/Sapling 6 Month****.* ***Authors:*** *Nelson & Cox, 7th edition,* ***ISBN:****9781319108236;* ***Publisher:*** *MPS (Macmillan Publishers).* Any other textbook in combination with lecture notes (power points) and Sapling Learning subscription for homework (see below) could also work.

Course format and Expectations:

I would like to keep the class as **interactive** as possible. At least one day before each class, I will post a set of learning outcomes and the associated reading materials on blackboard for the upcoming class. **You are expected to read the assigned material before the class and answer any sample questions (*counts toward the grade*) posted on Canvas, so that you can actively participate in the class discussion** by eliciting higher order thinking questions. You can identify the muddiest point or learning outcome that is difficult to realize on the discussion board, or through email which will allow me to give extra emphasis or rephrase the contents (to clarify it better) for that day just before the class. This approach is called Just-in-Time Teaching and is described here: http://www.styluspub.com/resrcs/user/ justintime.pdf**.**

You will also need to purchase a license to use **a personal response system (PRS)**. You could use your smart phone or PRS transmitter to register your responses in the class. To register your transmitter or mobile devices, setup an account at https://account.turningtechnologies.com/account/. **Bring your transmitter or mobile device to every class.** Once in class, set the channel number by pressing, "GO", "50", followed by "GO" again to register the channel on your transmitter. You enter the session ID, if you use mobile device to register the responses. If you use the transmitter in a different class, you will have to reset the channel number each day when you come to class. You use this device to take **an in-class quiz,** where the questions are directly related to the class learning outcomes.

In-class assignments will be done by groups of three students, assigned during the initial class periods. Each group will submit one (collective) assignment, and all group members will receive the same grade for the assignment. Students will be held to the Student Code of Conduct regarding their participation in these group assignments. **Because I drop your three lowest scores, there will be no make-up available for missed in-class assignments/PRS quizzes (for either excused or unexcused absences).**

Grading:

1. **Mid-term examinations (equally divided between two) – 30%**
   - **February 18, 2020**
   - **April 02, 2020**
2. **Final (comprehensive) - April 28, 2020 – 25%**
3. **Homework Assignments – 25%**
4. **Quizzes* and in-class assignments – 10%**
5. **Group assignment (submitted at the end of semester) – 10%**

(*Three lowest scoring quizzes will be excluded from grading. Absence from an in-class quiz leads to zero credit and is applied to lowest score criteria)

Homework assignment notices will be posted on Canvas. All the homework assignments will be done on Sapling Learning website. A subscription to Sapling Learning (https://www.saplinglearning.com/ibiscms) is part of the recommended online textbook. However, separate subscription is required, if the above recommended textbook is not used. All course materials covered in the classroom and book readings (designated chapters) will be an open game for homework and other assessments.

Group Assignments:

Group criteria: Three to four students that belong to two or three different majors can form a group (by **February 6**) select a topic of their interest (by **March 12**) and submit a report by the end of semester (by **April 23**). At least one group member should be from a different major. Each group will submit one report with names of members and their contributions. More instructions will be posted on the blackboard.

Scale for letter grades:

A- = 90-92.9%; A = 93-100%; B = 80-84.9%; B+ = 85-89.9%; C = 70-74.9%; C+ = 75-79.9%; D = 60-65%, D+ = 65-69.9%; F = <60%

Class Attendance Policy:

Attendance will be considered indirectly through in-class activities and quizzes. Students who do not attend class regularly will not do well in this course.

Electronic Communication:

I will post course materials and communicate important information outside of class on the Canvas. Make sure that your correct email address is registered with Canvas and follow a good practice of checking the course website on Canvas on regular basis. For email communication, use "CHEM3040_2020SS" in subject line.

Other Policy:

The university rules, including the Student Code of Conduct, and other documented policies of the department, college, and university related to academic integrity will be enforced. Violations of these regulations, including acts of plagiarism or cheating, will be dealt with on an individual basis according to the severity of the misconduct. Academic dishonesty will not be tolerated in this course. Students should review the Student Code of Conduct (http://www.uc.edu/conduct) and ensure they understand expectations for behavior and academic performance.

"The Department of Chemistry and the University of Cincinnati are not responsible for the personal belongings of students. All items brought to class are the student's responsibility. Students are strongly encouraged not to bring items to class that are not required for that class."

Class Schedule (subject to change based on the pace)

Date	#	Topic	Reading	
01/14	1	Introduction-The Foundations of Biochemistry	Chapter 1	
01/16	2	Chemistry of Aqueous Solutions	Chapter 2	HW1
01/21	3	Chemistry of Aqueous Solutions	Chapter 2	
01/23	4	Amino acids	Chapter 3	HW2
01/28	5	Amino acids and protein structure	Chapter 3	
01/30	6	Amino acids and protein structure	Chapter 3	
02/04	7	Protein Structure and Function	Chapter 4	HW3
02/06	8	Protein Structure and Function	Chapter 5	
02/11	9	Enzyme based catalysis	Chapter 6	
02/13	10	Enzyme based catalysis and Review	Chapter 6	
02/18		Midterm exam I		
02/20	11	Enzyme kinetics	Chapter 6	
02/25	12	Enzyme kinetics	Chapter 6	HW4
02/27	13	Enzyme Regulation	Chapter 6	
03/03	14	Protein Purification & analytical methods	Chapter 3	
03/05	15	Protein Purification & analytical methods	Chapter 4	HW5
03/10	16	Carbohydrates and glycoproteins	Chapter 7	
03/12	17	Nucleic Acids, structure-Function	Chapter 8	
03/17		Spring break		
03/19		Spring break		
03/24	18	Flow of genetic information	Chapter 9	HW6
03/26	19	Recombinant DNA technology	Chapter 9	
03/31	20	Molecular evolution and bioinformatics	Chapter 9	
04/02		Midterm exam II		
04/07	21	Lipids	Chapter 10	HW7
04/09	22	Membranes and transport	Chapter 11	
04/14	23	Membranes and transport	Chapter 11	
04/16	24	Membranes and transport	Chapter 11	HW8
04/21	25	Signal transduction pathways	Chapter 12	
04/23	26	Signal transduction pathways and Review	Chapter 12	

04/28 Final comprehensive exam: 9:45 am to 11:45 am