

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

Course number: CHEM3040

Course ID: 121078

Course name: INTRODUCTION TO BIOCHEMISTRY

Class: 70820

Lecture Room: Remote instruction through WebEx

No. of credits: 3

Faculty: Bala Addepalli

E-mail: balasual@ucmail.uc.edu (*best way to contact*)

Class hours: Tuesday and Thursday 09:45 AM to 11:15 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 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.

The entire curriculum in this semester would be taught through Remote Learning. So, every student needs a laptop with internet facility to attend the class sessions, take tests in the form of quizzes or midterms or final exam. Homework is done on Sapling.

Communication	Email and Canvas announcements
Course Materials and Readings	Canvas Modules, published files
Lectures and Course activities	WebEx sessions
In class-quizzes	Post-class quizzes to be answered on same day
Homework assignments	Sapling Learning
Student Learning assessments	Online tests

Because I drop your three lowest scores for both pre-class and post-class quizzes, there will be no make-up available for missed quizzes (for either excused or unexcused absences).

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 Canvas 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>.

Grading:

- | | | |
|--|---|-----|
| 1. Mid-term examinations (equally divided between two) | – | 30% |
| • June 11, 2020 | | |
| • July 16, 2020 | | |
| 2. Final (comprehensive) – August 06, 2020 | – | 25% |
| 3. Homework Assignments | – | 25% |
| 4. Quizzes* (Pre- and Post-class) | – | 10% |
| 5. Group assignment (submitted at the end of semester) | – | 10% |

(*Three lowest scoring quizzes will be excluded from grading)

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 **June 2**) select a topic of their interest (by **June 30**) and submit a report by the end of semester (by **August 4**). 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 participation in quizzes. Students who do not attend class sessions 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_2020US**” 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.”

2020 US CHEM3040 class WebEx sessions

Hosted by Bala Addepalli

Tuesday, May 12, 2020 9:40 am | 1 hour 40 minutes | (UTC-04:00) Eastern Time (US & Canada)

Occurs every Tuesday, Thursday effective 5/12/2020 until 8/6/2020 from 9:40 AM to 11:20 AM, (UTC-04:00) Eastern Time (US & Canada)

Meeting number: 614 857 584

Password: 4EHvCD3JPP3

<https://ucincinnati.webex.com/ucincinnati/j.php?MTID=m2ab6ca6ea91623a44136480354d8454c>

Join by video system

Dial 614857584@ucincinnati.webex.com

You can also dial 173.243.2.68 and enter your meeting number.

Join by phone

+1-415-655-0002 US Toll

Access code: 614 857 584

Class Schedule (subject to change based on the pace)

<u>Date</u>	<u>#</u>	<u>Topic</u>	<u>Reading</u>
05/12	1	Introduction-The Foundations of Biochemistry	Chapter 1
05/14	2	Chemistry of Aqueous Solutions	Chapter 2 HW1
05/19	3	Chemistry of Aqueous Solutions	Chapter 2
05/21	4	Amino acids	Chapter 3 HW2
05/26	5	Amino acids and protein structure	Chapter 3
05/28	6	Amino acids and protein structure	Chapter 3
06/02	7	Protein Structure and Function	Chapter 4 HW3
06/04	8	Protein Structure and Function	Chapter 5
06/09	9	Enzyme based catalysis	Chapter 6
06/11		Midterm exam I (on Canvas)	
06/16	10	Enzyme based catalysis and Review	Chapter 6
06/18	11	Enzyme kinetics	Chapter 6
06/23	12	Enzyme kinetics	Chapter 6 HW4
06/25	13	Enzyme Regulation	Chapter 6
06/30	14	Protein Purification & analytical methods	Chapter 3
07/02	15	Protein Purification & analytical methods	Chapter 4 HW5
07/07	16	Carbohydrates and glycoproteins	Chapter 7
07/09	17	Nucleic Acids, structure-Function	Chapter 8 HW6
07/14	18	Flow of genetic information	Chapter 9
07/16		Midterm exam II (on Canvas)	
07/21	19	Recombinant DNA technology & bioinformatics	Chapter 9
07/23	20	Lipids	Chapter 10
07/28	21	Membranes and transport	Chapter 11 HW7
07/30	22	Membranes and transport	Chapter 11
08/04	23	Signal Transduction	Chapter 12
08/06		Final Exam (on Canvas)	