

# Chemistry 365

## Biochemistry, Cell & Molecular Biology I

### Spring 2020

#### Instructor:

Dr. Christal Sohl, Ph.D.  
Department of Chemistry and Biochemistry  
Office: CSL 328  
e-mail: [csohl@sdsu.edu](mailto:csohl@sdsu.edu)

#### Course time:

12:30-1:45 p.m., Tues. & Thurs., NE-060

#### Student help hours:

Tuesdays 2:30-4:30 in CSL 328

Exceptions known at this time:

2/18 office hours cancelled; moved to Fri 2/21, 9-11 am instead

No office hours 3/31 (spring break)

*Due to our class size and lack of TA, I cannot effectively respond to emails, so make use of help hours. If you are asking a question that is in the syllabus, I will not respond. Please also note that office hours are one of the few ways I can get to know you. If you plan to ask for a letter of recommendation for professional schools, I can only write one if I feel I know you well enough to comment specifically and extensively on you and your potential. This includes coming often to help hours (i.e., I know who you are beyond your grade!). This is for your protection (letters focusing only on grades and other generic attributes tend to be seen as more negative than positive, even if you have a very high grade), and for mine (if just 10% of students in CHEM 365 ask for letters each semester, this can mean I am writing 40 letters per year just from this course alone).*

#### Textbooks:

Fundamentals of Biochemistry: Life at the Molecular Level, 5th Edition, D. Voet, J. Voet & C.W. Pratt (John Wiley & Sons, Inc.)

This is an Immediate Access Course. The required course text material for this class is provided in a digital format by the first day of classes and are free through the add/drop date. Your SDSU student account will then be charged a special reduced price for use of the materials for the remainder of the semester unless you opt-out of the content by 11:59 PM on the add/drop date. Please visit [www.shopaztecs.com/immediateaccess](http://www.shopaztecs.com/immediateaccess) for additional information about Immediate Access pricing, digital subscription duration, print add-ons, opting out and other frequently asked questions.

If you opt out of the program, that does NOT mean you have dropped the class. If you have any problems with accessing these materials or adding/dropping online access, please email [immediateaccess@aztecmail.com](mailto:immediateaccess@aztecmail.com)

*Do not contact me as I cannot assist you in this matter.*

### Other required course materials:

**-Mobile Reef/iClicker classic polling system.** Traditional handheld clickers or Mobile reef will be used.

1. How to set up a Reef account (temporary or permanent):

<https://community.macmillan.com/docs/DOC-7294-create-a-reef-account-and-register-an-iclicker-remote>

2. Reef Student Support homepage:

<https://community.macmillan.com/community/iclicker-support/iclicker-student-support/pages/iclicker-reef-student-application>

**-Red ParScore (small/narrow) scantrons**, non-programmable calculators, and #2 pencils/erasers for each exam will be required.

-Information will be posted on Blackboard, so please check this site regularly. Most lectures will be posted here.

### Course details:

*Prerequisites* - Chemistry 232, and 232L; Biology 203 and 203L

*Course description* - This is the first in a series of integrated courses (Chem 365, Biol 366, Biol 366L, Biol 567, and Biol 567L). Biochemistry and molecular biology allow us to explain the diverse and complex processes required for life and what goes awry in disease. This is a thriving area of research, and so I will supplement the assigned text with examples of the types of cutting-edge research and case studies of diseases related to our topics of study.

#### *Overall learning goals:*

- 1) To understand that life consists of a complex set of chemical processes
- 2) To integrate system-wide the biomolecules that perform and/or are affected by these processes
- 3) To have the tools to evaluate the biological functions at work in health and disease
- 4) To decide that you can help society in evaluating and disseminating accurate scientific information
- 5) To discover that science is an ongoing endeavor; that what we are learning in class is the foundation for laboratory research addressing human disease, environmental issues, technology development, etc.

#### *Specific learning objectives:*

- 1) To know the biological role of biomolecules, understand their building blocks, and apply their chemical characteristics to explain how they are suited for their role
- 2) To understand the structure/function relationship of biomolecules, and use these features to make connections to other classes of biomolecules
- 3) To apply basic equations to assess energetics, buffering, and enzyme kinetics and inhibition
- 4) To evaluate how class concepts are being used in the lab and in the health fields

*Resources available to students* - The text is the primary resource for this course. Lectures will not fully cover all textbook topics, although a short list of "lecture goals" will be highlighted at the beginning of each lecture to aid students in studying for exams.

Most slides used in lectures will be posted in Blackboard, but answers to In-Class Problem Sets and Reef/iClicker questions will not be posted. You will miss this material if you don't attend. Make use of office hours to ask questions about material you find confusing before you encounter it on your exam.

*In Class Problem Sets* – There will be three In-Class Problem Sets to help students master learning objectives and prepare for exams that will be worked in class for points. These days do not additionally count for a regular day's clicker points; they are on their own grading scale (see below). In addition, students will benefit from being able to answer the “checkpoint” questions and the problems present at the end of chapters in the textbook.

*Participation* – Students participate by answering In-Class Reef/iClicker questions and by participating in think/pair/share and class discussions. For the Reef/iClicker questions, you will be graded on participation, not whether you have answered the questions correctly. You **must** register for the Reef/iClicker software for this class to receive credit. Students will not receive any points for days they experience any malfunctions or do not bring the necessary materials, no exceptions. **You must have >75% attendance over the semester to receive full points. Reef/iClicker points are not awarded as partial credit. I expect you to monitor your points throughout the semester so that you can rectify any issues with your iClicker ASAP.**

*Exams and grading* – There will be 4 exams, including the final which is not cumulative. Each exam is worth 100 points. **You will need to purchase and bring the small red parscore scantrons, #2 pencils, and non-graphing calculators to each exam.**

**Exam 1:** Chapters 1-3 (100 points)

**Exam 2:** Chapters 4-6 (100 points)

**Exam 3:** Chapters 7-10 (100 points)

**Exam 4:** Chapters 11-12 (100 points)

**Participation:** In-Class Problem Set 1 (25 points, no partial credit), In-Class Problem Set 2 (25 points, no partial credit), In-Class Problem Set 3 (25 points, no partial credit), answering 75% of iClicker questions (25 points, no partial credit), for 100 points total

**Total course points: 500**

*Curving* – I may curve each exam to have an average between 65-70 (if the class average is higher than 70, I will not curve down, I will just not curve that exam). **I will not curve your final score.** Curving is at my discretion, policies may change, and I do not solicit opinions on curving from students (so don't waste your time telling me your thoughts, please!)

*Tentative grading scale* –

A =  $\geq$  92.5%

A- = 89.5-92.4%

B+ = 87.5-89.4%

B = 82.5-87.4%

B- = 79.5-82.4%

C+ = 77.5-79.4%

C = 72.5-77.4%

C- = 69.5-72.4%

D+ = 67.5-69.4%  
D = 62.5-67.4%  
D- = 59.5-62.4%  
F < 59.4%

*Expectations* - I expect you to:

- 1) Read the textbook material before coming to class. We cannot cover everything in class, so reading the text is vital. Doing so before the class will help you fully engage.
- 2) Attend lectures and participate in learning.
- 3) Help provide a positive and safe space for learning. This includes showing respect to your peers and I, and not using cell phones or disrupting others by websurfing.
- 4) Seek help during office hours as needed.

*Attendance and absences* – Lectures will provide material beyond the scope of the text including focus on medical relevance and technological tools used in research labs, so attendance is strongly encouraged. To receive full percentage points in participation, you must participate in the In-Class Problem sets and answer 75% of the Reef/iClicker questions over the course of the semester -- these points are issued as “all or nothing”. Thus skipping class will negatively impact your grade. Having someone answer your Reef/iClicker questions is academic misconduct and will be treated as such.

You are required to attend class on exam days and in-class problem set days. If you are going to miss an exam and/or an in-class problem set and have a valid excuse, I need to know at least 1 week in advance (with the exception of documented medical or other emergencies to be assessed at my discretion). Come and see me AND email me so I have written record of this. You are required to provide a written excuse from the Office of Student Life. **If you miss an exam or Problem Set and 1) do not have a valid excuse and documentation and 2) did not communicate this absence to me in advance both in person and via email, you will not be able to make up points. Reef/iClicker points for non-In-Class Problem Sets days cannot be made up.** If you miss an exam and meet all of the requirements listed, I will average your three other exams and use this average for your missed exam. **There are no make-up exams.**

*Students with Disabilities* - The University is committed to providing reasonable academic accommodation to students with disabilities. If you require accommodation, contact the Student Disability Services Office (or visit [http://go.sdsu.edu/student\\_affairs/sds/](http://go.sdsu.edu/student_affairs/sds/)) at (619) 594-6473. The instructor cannot provide any test accommodations without the prior consent of Student Disability Services.

*Religious Observances* - By the end of the second week of classes, students should notify the instructors of any planned absences for religious observances. The student and instructor will work together to reasonably accommodate students who have notified in advance of planned absences for religious observances.

*Statement on Cheating and Plagiarism* – Basically, don't cheat! The University adheres to a strict [policy regarding cheating and plagiarism](http://studentaffairs.sdsu.edu/srr/conduct1.html) (<http://studentaffairs.sdsu.edu/srr/conduct1.html>). If you cheat you will receive an F for the course and you will be referred to the University for disciplinary measures. If you have questions on what is plagiarism, please consult the [policy](http://www.sa.sdsu.edu/srr/conduct1.html) (<http://www.sa.sdsu.edu/srr/conduct1.html>). If you feel overwhelmed, come to office hours. Appreciate how cheating can ruin your otherwise bright future.

*Syllabus is Subject to Change* - This syllabus and schedule are subject to change. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

*Student Privacy and Intellectual Property:* The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will use Blackboard to communicate with you, and I will not post grades or leave graded assignments in public places.

*The following schedule provides the topics, required readings, and important dates.*

<b>Date</b>	<b>Topic</b>	<b>Corresponding chapter</b>
1/23	1: Chemistry of life Case study: What's in a genome?	Chap 1
1/28	2: Energy in biological systems	Chap 1
1/30	3: Water, acids, bases and buffers; non-covalent interactions Case study: can you alter your pH with diet?	Chap 2
2/4	4: Intermolecular forces, nucleotides, nucleic acids, and genetic information	Chap 2, 3
2/6	5: DNA replication, DNA sequencing Case study: how do we treat HIV?	Chap 3
2/11	6: Genomics and CRISPR Case study: power and ethics of CRISPR	Chap 3
2/13	7: Recombinant DNA technology	Chap 3
2/18	8: Group work: in-class problem set 1 <i>No office hours today. MAKE UP HOURS 9-11 am Friday, 2/21 in CSL 328</i>	Review for Exam, Chap 1-3
2/20	9: <b>Begin Exam 2 material:</b> Amino acids	Chap 4,5
2/25	<b>EXAM 1 (CHAPTERS 1-3)</b>	
2/27	10: Proteins: primary, secondary, tertiary, and quaternary structure	Chap 6
<i>Extra credit opportunity: <b>Fri. Feb. 28, 4pm in GMCS 301:</b> hear a seminar by scientist Dr. Natalie Hosea. See lecture 10 for more details</i>		
3/3	11: Protein purification, protein sequencing, Western blotting	Chap 5
3/5	12: Proteins: Stability and folding, Tools of the trade: proteomics/mass spectrometry, Prep for Hands-on Demo	Chap 6
3/10	13: Tools of the trade: X-ray crystallography Hands-on Demo (bring your laptops!): targeting kinases in cancer	Focus on lecture slides
3/12	14: Gene and protein regulation, PTMs	Focus on lecture slides
3/17	15: Group work: in-class problem set 2	Review Chaps 4-6

3/19	16: <b>Begin Exam 3 material:</b> Protein function: Mb, Hb. Note: we begin new material before the exam so you won't be tested immediately on new material!	Chap 7
3/24	<b>EXAM 2 (CHAPTERS 4-6)</b>	
3/26	17: Monosaccharides, disaccharides, polysaccharides	Chap 8
3/30-4/3: Happy Spring Break and Cesar Chavez Day		
4/7	18: Case study: alpha-gal; Lipids and membranes	Chap 9
4/9	19: Membranes and membrane proteins, passive membrane transport, student-led interest	Chap 9,10
4/14	20: Active membrane transport, Group work: in-class problem set 3	Review Chaps 7-10
4/16	21: <b>Begin Exam 4 material:</b> Enzymatic catalysis; Student-led interest: TBD Note: we begin new material before the exam so you won't be tested immediately on new material!	Chap 11
4/21	22: Mechanisms catalyzed by enzymes; tools of the trade: HDX	Chap 11
4/23	<b>EXAM 3 (CHAPTERS 7-10)</b>	
4/28	23: Enzyme kinetics, Michaelis-Menten equation	Chap 12
4/30	24: Enzyme kinetics cont., inhibition	Chap 12
5/5	25: Enzyme kinetics, cont. Demo: reaction rates; case study: enzyme-less world	Focus on lecture slides
5/7	26: Catch up on any material, In-class problem set for review (bring calculators) <i>*Note, today's In-class problem set is scored only for regular Reef/iClicker credit*</i>	Review Chaps 11-12
Thurs 5/14, 10:30- 12:30 pm	<b>FINAL EXAM (CHAPTERS 11-12)</b> Same room, not cumulative.	

**Confirm final exam date/time here, as sometimes it changes after the development of this syllabus:**

[https://registrar.sdsu.edu/calendars/final\\_exam\\_schedule/spring\\_2020\\_final\\_exam\\_schedule](https://registrar.sdsu.edu/calendars/final_exam_schedule/spring_2020_final_exam_schedule)