

Biology 3515/Chemistry 3515
Biological Chemistry Laboratory
Spring 2022

Course Mechanics for Spring 2022:

Both the lecture and laboratory sessions for this course are currently scheduled to meet in person. The lectures will be recorded (with only the audio and slides) and these recordings, along with the slides, will be posted on Canvas. But the sessions will not be live-streamed. Accommodations will be made for those unable to attend lecture or lab sessions because of COVID-19 or other unavoidable absences. For absences related to COVID, please request an accommodations by filling out the online form at:

<https://www.biology.utah.edu/secure/covid-accommodations> For absences due to other illnesses, family emergency or an official University of Utah activity, please contact the instructor by e-mail at goldenberg@biology.utah.edu.

Course Description and Objectives:

This course is intended for students who have taken Biology 3510/Chemistry 3510. The laboratory course will cover enzyme kinetics, methods of protein fractionation, and techniques for characterizing proteins. There will be a heavy emphasis on quantitative analysis and the use of computers for data collection, data analysis and molecular modeling. At the end of the course, students will have gained skills in modern biochemical laboratory techniques and methods for data analysis. They will also gain an improved understanding of the relationships between protein structure and function, particularly for enzymes.

Prerequisites:

Biology 3510 or Chemistry 3510

Instructor:

David P. Goldenberg
Office: 306 Aline Skaggs Biology Building
Telephone: 581-3885
E-mail: goldenberg@biology.utah.edu
Office hours (via Zoom, starting Tuesday, 18 Jan.):

Tuesdays: 11:00 AM - noon

Wednesdays: 2:00 PM - 3:00 PM

Other times by appointment. The best way to contact me is by e-mail.

Teaching Assistants:

Monday: Molly Czachor, Molly.Czachor@utah.edu

Tuesday: Amanda Hogan, u0961420@utah.edu

Wednesday: Victoria Ding, u1020647@utah.edu

Thursday: Emily Yang, u0835353@utah.edu

COVID-19 Precautions and Information

Given the current rates of COVID-19 infections in Utah, wearing a face mask in class is strongly encouraged. According to the CDC, wearing a mask remains an effective means of preventing infection for both unvaccinated and vaccinated people. Regardless of what

someone chooses (mask or no mask), the university seeks to foster a sense of community and asks everyone on campus to be respectful of individual decisions on mask wearing. Current university COVID information can be found at these sites:

- General COVID-19 information and guidelines:
<https://coronavirus.utah.edu>
- On-campus vaccination information:
<https://alert.utah.edu/covid/vaccine/>
- COVID testing information:
<https://alert.utah.edu/covid/testing/>
- Self reporting forms: In order to help monitor the spread of COVID-19 and respond appropriately, the university requires that all students, faculty and staff complete a reporting form if they have been exposed to, are being tested for or have been diagnosed with COVID-19:
[Self-reporting Form](#)
- Exposure guidelines: If you have been exposed to COVID-19, you should read and follow the guidelines posted at:
[University COVID exposure guidelines](#)

Lectures:

Tuesday and Thursday, 9:40 - 10:30 AM, Room 208, Crocker Science Center (CSC)

No classes on:

Monday, 17 January (Martin Luther King Day)

Monday, 21 February (Presidents Day)

Week of Monday, 7 March (Spring Break)

Regular class attendance is expected of all students. These sessions will have a mixed lecture-discussion format, and engaged participation is essential for learning. The lectures will be recorded, with only the audio and slides, and these recordings, along with the slides, will be posted on Canvas. But the recordings and slides should not be viewed as a substitute for attending class. They are intended primarily for review and for those who are unable to attend because of illness, family emergency or an official University of Utah activity.

Electronic Device Policy

In order to encourage student engagement and create a more effective learning environment for everyone, the use of cell phones, tablet computers or laptop computers will not be allowed during lectures. Cell phones may be accessed during class only in cases of emergencies.

Exceptions to this policy will be made for students who need to use an electronic device as part of an approved accommodation. See the section below on Special Accommodations for information about applying for an accommodation through the Center for Disability Services.

Clickers:

The iClicker audience response system will be used to facilitate interactive learning during the lectures. Responses will be graded and will count for 5% of the course grade. For some questions, credit will be given for any answer, but for others points will only be given for correct answers.

Although there is an iClicker app for mobile devices, it will not be supported in this class. (See the electronic device policy above.) You will thus need to purchase or rent one of the following two remote devices:

- **iClicker+**
- **iClicker 2**

The Campus Store will have the iClicker+ available for sale for \$44.99 and will buy back the device for approximately half that amount at the end of the term. Alternatively, the links above provide information for purchasing or renting the devices directly.

To use the iClicker device with this class, the following steps are required:

1. If you do not already have an iClicker account, you will need to create one before classes begin, following the instructions at:

[How-to-Create-an-iClicker-Student-Account](#)

2. Register your iClicker remote device so that it is linked to your account:

[How-to-Register-an-iClicker-Remote](#)

Follow the instructions under the heading “My instructor is using iClicker Cloud”.

3. Add Biol 3515/Chem 3515 to your account, as described here:

[Add-Your-Instructor-s-Course-in-the-iClicker-Student-App](#)

The course should be listed with the title, “Biological Chemistry Laboratory”, and the course ID, “Biol 3515/Chem 3515”.

4. Use of the iClicker system requires a license. If your clicker was purchased new, it will come with a five-year license, and there will be no additional charges. If, however, you buy a second-hand clicker that was previously registered to another account, you will need to purchase a license. Similarly, rented clickers do not include a license. When you create a new iClicker account, you will receive a free two-week trial license. At the end of this period, however, you will need to purchase a license (if you don’t already have one). A license for six months costs \$15.99, and other pricing options are listed here:

<https://www.iclicker.com/pricing>

For each class session where the clickers are used, there will be a total possible score of 5 points, divided evenly among the number of questions asked. There will also be 1 possible participation point, which is earned by answering at least 75% of the questions (correctly or otherwise),

To allow for unavoidable absences, the lowest four clicker point scores will be dropped when calculating the course grade. Bonus clicker points can be earned by finding errors in the lab manual or lecture slides. To earn points, though, you must be the first to let the instructor know about the error!

Text book:

There is no required text book for this course. There is, however, a *recommended* text entitled “Fundamental Laboratory Approaches for Biochemistry and Biotechnology” (2^{ed}), by A.J. Ninfa, D.P. Ballou and M. Benore. This text is available at the bookstore, and several copies have been placed on reserve at Marriott Library. In addition, it may be helpful to review material from a standard biochemistry text, such as those by Berg, Tymoczko and Stryer or by Voet and Voet.

Laboratory manual:

A special manual, entitled “Laboratory Experiments in Biochemistry” has been prepared for this course and is available at the University bookstore.

Web page:

In addition to the Canvas site, there is a course web page:

<http://goldenberg.biology.utah.edu/courses/biol3515>

Much of the information in this syllabus is also posted there, and there are some additional resources that are not so easily included in Canvas. But, this web site will not be updated as regularly as Canvas, which will be the primary means of communication.

Laboratory sessions:

The class is divided into four laboratory sections, each meeting once a week on Mon., Tues., Wed. or Thurs. All sections will meet from 1:00 to 5:00 PM. Except for the computer sessions noted below, the laboratory sessions will be held in Room 143 in the Crocker Science Center.

Computer sessions: During the weeks of 21 January and 7 February, the lab sections will meet in Room 150 of the Biology Building for computer sessions. These sessions will begin at 2:00, but will end no later than 5:00.

Lab safety:

- Some of the reagents you will be handling in the lab are quite caustic and can cause serious eye injury. **Safety glasses will be required for all laboratory sessions.**
- Latex or nitrile gloves are required whenever you are handling reagents.
- Shoes must fully cover your feet for protection from broken glassware and other hazards.
- Full-length trousers or equivalent are required.
- Lab coats will be provided at no cost, and must be worn in the lab.
- Personal electronic devices, including phones, tablet computers and laptop computers, will not be allowed in the laboratory (with one exception, when a phone will be used to photograph part of an experiment.). This is to avoid both distractions and possible chemical contamination that could be spread outside the lab. There is a classroom immediately adjacent to the lab, and reserved for the course, where you are free to use your laptop for working on lab reports.

Electronic Laboratory Notebooks:

You will be keeping notes, storing data and preparing the lab reports using an online electronic notebook system called LabArchives. Instructions and links for setting up your LabArchives account will be available on the Canvas page for this course.

When setting up your account it is very important to use your University of Utah UMail e-mail address, of the form uNID@utah.edu. Do not use an alias to your UMail account (such as my.name@utah) or another account, such as a gmail account. Sorting things out once you once an account has been created using the wrong e-mail address is painful for everyone involved. But, once the account is set up, it is easy to change the e-mail address associated with the account.

After logging on to LabArchives, you should find an online notebook set up for this class, containing a page named "Getting Started". On this page you will find links to some tutorial material, and you should start getting to know the system before your first lab session.

Laboratory Reports:

For each of the six experiments, a summary report will be due approximately two weeks after the completion of the experiment. The due dates for the individual lab reports are indicated on the Laboratory Schedule on the class web page. This report is to be created within LabArchives and will be submitted electronically as a pdf file. In some cases, the report will also include some molecular modeling exercises.

Reports will be accepted up to 7 days late, but a 10-penalty for each day late will be imposed. Reports will not be accepted after 7 days beyond the due date.

Although you will be working in groups of three in the laboratory, each of you is responsible for writing your own reports. You may certainly consult the instructors, the TAs or other students as you work. **But, the actual work handed in (other than the primary lab data) must be your own. Any, data analysis files, molecular modeling files, text or other material must be clearly distinguishable from that of other students.**

Other sources must be properly cited. Text from other sources must be clearly identified by quotation marks. Furthermore, extensive quotations, even with proper citation, will not be considered satisfactory answers to questions. Copying and pasting does not demonstrate mastery of the material!

If two or more students turn in work that that is identical, their action will be considered academic misconduct and appropriate sanctions will be imposed. At a minimum, the sanction will include the loss of credit for the copied work, and more severe sanctions may be imposed for more extensive infractions. (See additional information below regarding Academic Conduct.)

Additional information about the laboratory notebook and reports can be found on pp.1–13 of the laboratory manual.

Quizzes and Final Exam:

There will be two quizzes during the class periods on the following dates:

- Thursday, 10 February
- Thursday, 24 March

Each of the two quizzes will be about 25 minutes long and will cover material from the lectures and laboratory sessions since the previous quiz.

A cumulative, 1-hour final exam will be held during the first half of the scheduled exam period for this class:

- Friday, 29 April. 10:30–11:30 A.M.

Grades:

The course grade will be determined the laboratory reports, quizzes and in-class responses, weighted as follows:

- Laboratory reports: 70%
- Quizzes: 12.5%
- Final exam: 12.5%
- In class clicker responses: 5%

The following represent maximum cutoffs for determining class letter grades:

- A: 92–100% (including A-)
- B: 82–91% (including B- and B+)
- C: 70–81% (including C- and C+)
- D: 60–69%
- E: < 60%

Depending on how things go, the grade cutoffs *may* be revised downwards, *i.e.*, to make the grading more generous. The cutoffs will not be moved upwards to make the grading less generous.

Important Dates:

- Last day to drop (delete) classes: Friday, 21 January (No tuition penalty; class does not appear on record.)
- Last day to add classes or elect CR/NC option: Friday, 21 January .
- Last day to withdraw from classes: Friday, 4 March (No tuition refund, “W” appears on transcript).
- Last day to revers CR/NC option: Friday, 22 April.
- Last day of classes: Tuesday, 26 April.

Excused Absences

For absences related to COVID, please request an accommodations by filling out the online form at:

<https://www.biology.utah.edu/secure/covid-accommodations>

For absences due to other illnesses, family emergency or an official University of Utah activity, please contact the instructor by e-mail at goldenberg@biology.utah.edu.

For excused absences, you will be offered at least one option for obtaining the lab data necessary for the report, depending on the circumstances. The options may include joining another lab session, completing an online version of the experiment or obtaining the data from your lab partners.

To allow for missed lectures, the four lowest clicker scores will be dropped from the average from the semester. If you have to miss more than four lectures because of illness, family emergency or an official University of Utah activity, please contact the instructor.

Unexcused Absences

Attendance will be taken in each lab session, including the two computer sessions. If you miss a lab session without an accepted excuse, you may complete your lab report using the data recorded by your lab partners. However, there will be a 20-point penalty applied to

your lab report grade for each missed session.

Expected Learning Outcomes

What you learn from this class will depend greatly on your preparation and efforts. Students who are well prepared and who put a conscientious effort into all of the class components can expect to enhance their theoretical and practical understanding of:

- Applications of pH and ionization equilibria in biochemistry.
- Applications of absorbance spectrophotometry in biochemistry.
- Methods of quantitative data analysis, especially curve fitting.
- Protein structure and molecular modeling, including the use of the computer program PyMOL.
- Mechanisms of enzyme catalysis and inhibition, particularly in proteases.
- Analysis of enzyme kinetic data.
- Principles and application of electrophoresis for characterizing proteins.
- Principles and application of chromatography for characterizing proteins.

University Policies

Faculty and Student Responsibilities:

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code (<http://regulations.utah.edu/academics/6-400.php>). Students have specific rights in the classroom as detailed in Section II of the Code http://regulations.utah.edu/academics/6-400.php#section_2. The Code also specifies expectations of student behavior (Section III, http://regulations.utah.edu/academics/6-400.php#section_3). Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the responsibility of faculty to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Special Accommodations:

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access (<https://disability.utah.edu/>). CDA will work with you and the instructor to make arrangements for accommodations.

Academic Conduct

In order to ensure that the highest standards of academic conduct are promoted and supported at the University, students must adhere to generally accepted standards of academic honesty. Acts of academic misconduct include cheating, plagiarizing, research misconduct, misrepresenting one's work, and inappropriately collaborating. Suspected cases of academic misconduct will be dealt with according to the rules found in the Student Code, University Policy 6-400(V)(<http://regulations.utah.edu/academics/6-400.php>). Instances of academic misconduct will be recorded in a database that may be made available to other University of Utah Departments and Colleges.

Title IX: Addressing Sexual Misconduct:

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action (<http://oeo.utah.edu/>, 135 Park Building, 801-581-8365), or the Office of the Dean of Students (<http://deanofstudents.utah.edu>, 270 Union Building, 801-581-7066). For support and confidential consultation, contact the Center for Student Wellness (<http://wellness.utah.edu>, 426 SSB, 801-581-7776). To report to the police, contact the Department of Public Safety (<http://dps.utah.edu>, 801-585-2677(COPS)).

University Safety Statement The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit <http://safeu.utah.edu>.

Final Note:

This syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.