

Biology 3515/Chemistry 3515
Biological Chemistry Laboratory
Spring 2021

Course Mechanics for Spring 2021:

Because of the COVID-19 pandemic, BIOL 3515/CHEM 3515 is being taught online this semester, as an Instructional Video Conferencing (IVC) class. Both lecture and lab sessions will be held at the scheduled times via Zoom. Quizzes and exams will also be administered online. Participation in the course will depend on having access to a computer and broadband internet connection, as well as being able to use Canvas, Zoom and other online resources effectively. Please contact the instructor as soon as possible if you have concerns about these requirements. Further details are provided in the sections below.

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
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Telephone: 581-3885
E-mail: goldenberg@biology.utah.edu
Office hours (via Zoom):
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:

Tuesday: Noelle Reimers, u1199730@utah.edu
Wednesday: Kyle Knutsen, u0865708@utah.edu
Thursday: Darian Murray, u0920209@utah.edu
At large: Karina Ceden, cedeno.karina@utah.edu

Canvas:

Nearly all of the material for this course will be distributed through Canvas, which will also be used for submitting lab reports and recording grades.

Course Web Site:

In addition to the Canvas site, there is a public 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.

Lectures:

Tuesday and Thursday, 9:40 - 10:30 AM, via Zoom

All class sessions will be held via video conferencing, using Zoom, and regular attendance is expected. The class sessions will have a mixed lecture-discussion format, and engaged participation is essential for learning. The Zoom sessions will be recorded and made available online to accommodate unavoidable absences, and slides from the lectures will be posted on Canvas (after the class session). But, these resources should not be viewed as a general substitute for attending class. See page 5 for information regarding excused and unexcused absences.

During the period between 1 March through 12 March, all University of Utah classes will be online. For this class, there will be no change in format during these periods. However, in honor of the spring break that was canceled, there will be no lab sessions during the week of 8 March.

Clickers

The iClicker audience response system will be used to facilitate interactive learning during the IVC lecture sessions. The 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. 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!

Before the first class you should create an iClicker Reef account and set it up for this course, following the instructions provided on the Canvas course page.

Technical Requirements:

To effectively participate in the Zoom class sessions and to complete the class assignments, you will need to have an adequate desktop or laptop computer and access to a broadband internet connection. As a very rough guideline, a computer manufactured in the past five years should be fine. Laptops are available for checkout from the Marriot Library for the semester, depending on availability:

<https://lib.utah.edu/coronavirus/checkout-equipment.php>.

You will also need to be able to smoothly navigate Canvas and Zoom.

If you have concerns about any of these requirements, please contact the instructor as soon as possible.

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. Copies of this text are available at the bookstore, and copies will be 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. Under normal circumstances, this would be available for purchase in the bookstore. This year, however, it will be provided in electronic form on the Canvas page.

Laboratory sessions:

The class will be divided into three laboratory sections, each meeting once a week on Tues., Wed. or Thurs. All sections will meet from 1:00 to 5:00 PM, via Zoom. The laboratory sessions will be designed to emulate as closely as possible the normal lab experience, with video demonstrations, virtual experiments and data analysis.

Participation in all of the Zoom lab sessions is expected. See page 5 for information regarding excused and unexcused absences.

Electronic Laboratory Notebooks:

An online electronic notebook system, LabArchives, will be used for keeping notes, storing data and preparing lab reports. During the virtual lab sessions you should keep notes just as you would in an in-person lab. Shortly before classes start, you will receive an e-mail message containing a web link for setting up a LabArchives account. These links will also 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.edu) 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 generally 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 on page 6 regarding Academic Conduct.)

Additional information about the laboratory notebook and reports can be found in the first chapter of the laboratory manual.

Quizzes and Final exam:

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

- Thursday, 18 February
- Thursday, 18 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 scheduled exam period for this class:

- Thursday, 29 April. 10:30–11:30 A.M.

The quizzes and and final exam will be administered via Canvas, and will be subject to an honor code. For each quiz or exam, students will be required to sign an honor-code statement, stating that they have not communicated with anyone during the exam period or used any online or other resources. Violations of this honor code will be considered academic misconduct and appropriate sanctions will be imposed. At a minimum, a grade of zero will be recorded for the quiz or exam. (See additional information on page 6 regarding Academic Conduct.)

Grades:

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

- Laboratory reports: 65%
- Quizzes: 15%
- Final exam: 15%
- 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 add classes: Friday, 29 January.
- Last day to drop (delete) classes: Friday, 29 January (No tuition penalty; class does not appear on record.)
- Last day to withdraw from classes: Friday, 12 March (No tuition refund, “W” appears on transcript.)
- Last day to elect CR/NC option: Friday, 9 April.
- Last day to reverse CR/NC option: Friday, 23 April.
- Last day of classes: Tuesday, 27 April.

Excused Absences

If you must miss a lab session because of illness, family emergency or an official University of Utah activity, please let the lab instructor and your TA know as soon as possible. If it can be arranged, you may be able to do the lab work by joining another lab group on a different day of the week. If this cannot be arranged, you can obtain the lab data from the other members of your group and complete the lab report using that data.

If you miss a lecture because of illness, family emergency or an official University of Utah activity, please notify the instructor. Any clicker points missed because of an authorized absence will not be included in calculating the average for your clicker responses.

Unexcused Absences

Attendance will be taken in each lab session. 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 unexcused missed session.

If you miss a lecture without an accepted excuse, there will be no make up for any missed clicker questions.

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.