

Brooklyn College of the City University of New York
Department of Chemistry
Fall 2021 Syllabus – Professor Davenport
Chemistry 4571 W5 (8624)
Biochemistry I Lectures: Introductory Biochemistry
(3 credits)

Course Description & Goals: A one semester on-line course focused on the introduction to: 1) basic biochemical concepts; and 2) biochemical methodologies used for purification of complex biomolecules and elucidation of their structures. Lectures will focus on the properties of water; amino acids; proteins; enzymes; nucleic acids; lipids and membranes; carbohydrates; with a basic introduction to metabolism. This course is recommended for those students considering medical/dental school or graduate courses in biochemistry, and assumes an understanding of concepts covered in organic 1 chemistry (Chem 3511 & Chem 3512, or Chem 3510) and biology (Biol 2074 or Biol 1002).

Learning Objectives: Upon completion of the course, students will be proficient in:

- Understanding structure/function properties of biological macromolecules and the quantitative role of free energy, enthalpy and surface properties involved in ligand binding, macromolecular folding and membrane organization/function.
 - Understanding concepts of biological polymer (proteins and DNA) surface properties and their role in modern biochemical/biotechnology methodologies.
 - Conceptual, mechanistic and quantitative understanding of ligand binding, allosterism and cooperativity as illustrated by hemoglobin.
 - Conceptual, mechanistic and quantitative understanding of enzyme kinetics and inhibition, and broader applications for cellular metabolism.
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Overview: This is an online course. Course materials, announcements, homework questions, practice quizzes, exams, and test grades are available through the Blackboard course site. Blackboard is also used to attend the weekly synchronous course meetings, open office hours, and access posted asynchronous lecture videos. To attend/join the class, enter Blackboard Ultra and click on either the Blackboard Collaborate or Tools links located within the left-hand menu. Select the appropriate lecture date and join the live session. Where possible, all live classes will be recorded and posted in Blackboard along with pre-recorded video-lectures for students to review asynchronously.

Instructor Contact Information:

Professor Lesley Davenport
Email: LDvnport@brooklyn.cuny.edu
Tel: 718-951-5000 (ext. 2825). Calls are currently forwarded to an off-campus 'phone.

Office Hours:

“Drop-in” open office hours will be held online using Blackboard Collaborate located within the Blackboard Ultra meeting room:

- Monday: 12:30pm – 1:30pm
- Monday: 5:00pm – 6:00pm
- Wednesday: 6:30pm – 7:30pm

And by Zoom appointment (please email for an appointment).

Schedule of Lectures (2021):

Weekly synchronous class sessions will be held on Blackboard Collaborate Ultra at the official class times (Wednesdays: 5:05pm – 6:25pm) from August 25th through December 15th, inclusive. Where possible, these live sessions will be recorded for the benefit of those students who are unable to attend. Please be mindful that technical difficulties with Blackboard may preclude recording of the synchronous lecture sessions. Please do your best to attend the live sessions.

No Lecture Classes: Wednesday, September 8th and September 15th.

Important Dates (2021):

Wednesday, August 25th: Weekday classes begin.

Tuesday, August 31st: Last day to add a course.

Monday, September 6th: Last day to submit a Pass/Fail elective application online for Fall 2021.

Tuesday, September 14th: Last day to drop a course without a “W” grade.

Monday, December 13th: Last day to withdraw from a course with a “W” (non-penalty) grade.

Monday, December 6th: Last day for students to resolve outstanding assignments for Spring 2021 incomplete (INC) grades.

Examination Dates (2021):

(Lecture exams are non-cumulative).

Blackboard will be used for all quizzes and on-line lecture exams. Please note that there may be

a requirement for monitoring your test taking using software put in place by the college.

First Lecture Examination: Wednesday, October 6th (5:05pm - 6:25pm).

Second Lecture Examination: Wednesday, November 10th, (5:05pm – 6:25pm).

Final Lecture Examination: Wednesday, Dec. 15th, (6:00pm – 8:00pm) Time & Date to be confirmed.

Required Text:

Biochemistry, 4th edition, C.K. Mathews, K.E. van Holde, D.R. Appling and S.J. Anthony-Cahill. Pearson, 2013 (ISBN: 978-0-13-800464-4) (M).

Recommended Text:

Biochemistry, 8th edition, J.M. Berg, J.L. Tymoczko, G.J. Gatto, Jr. and L. Stryer. W.H. Freeman and Co., New York, 2015 (ISBN: 1-46-412610-0). The 5th edition (2002) is freely searchable from the NCBI/NIH Bookshelf: (<https://www.ncbi.nlm.nih.gov/books/NBK21154/?depth=10>).

Supplementary Material:

Practice problems taken (primarily) from: Biochemical Calculations, 2nd edition, I.H. Segel (John Wiley & Sons) will be posted on Blackboard Ultra.

For exam preparation, biochemistry multiple choice practice questions are freely available from on-line test banks. Using your web browser, type in: "biochemistry multiple choice questions".

Note: Video lectures and accompanying notes are posted using Blackboard. Please ensure that you have access to this class through Blackboard Ultra and check that the posted email address is the one that you access regularly.

Required Technology: You will need a desktop, laptop, or tablet computer with a reliable internet access for taking online exams. Also needed to successfully complete this course are your CUNY log-in credentials. A browser with access to Blackboard and Blackboard Collaborate Ultra systems will be required to both attend the synchronous course meetings, open office hours, and posted asynchronous lecture videos.

Blackboard Information: Further information regarding how to use and log-into Blackboard Collaborate can be found at: https://www.brooklyn.cuny.edu/web/abo_administrati on_provost_faculty/CTL_UsingBlackboardCollaborat e.pdf For additional questions about Blackboard Ultra, the following assistance is available:

- 718-951-4634/aitsupport@brooklyn.cuny.edu
- 646-664-2024/after-hours support (8pm-8am and weekends)

Course Organization: The course comprises five topics, which loosely follow entire chapters or sections of the chapter in the required textbook. For each lecture topic, lecture videos and associated lecture notes are available in Blackboard Ultra and can be followed asynchronously. Lecture videos and notes are intended to be viewed and studied prior to the interactive weekly synchronous lecture/discussion when specific problems and concepts can be discussed. Students are encouraged to post questions on the class Discussion Board for inclusion in the interactive live lecture time. Self-assessment quizzes and practice problems (which do not count towards the final course grade) will be provided to evaluate your understanding of the course material. Graded short "end-of-topic" quizzes or homework assignments (which may include questions after watching a lab simulation using the Labster platform) can be submitted through Blackboard.

Attendance: To do well in this course, attendance in active on-line lecture sessions is highly recommended. It easy to get left behind if you don't keep up with the material. Attendance will be recorded, but not graded.

Lecture Topics:

Topic 1: **Introduction to Biochemistry**

Scope of Biochemistry (Chapter 1M).
The Matrix of Life (Chapter 2M).
The Energetics of Life (Chapter 3M).

Topic 2: **Amino Acids, Proteins and Enzymes**

Introduction to Proteins (Chapter 5M).
The 3D-Structures of Proteins (Chapter 6M).
Protein Function and Evolution (Chapter 7M).
Enzymes: Biological Catalysts (Ch. 11M).

Topic 3: **Nucleic Acids**

Nucleic Acid Structure (Chapter 4M).
DNA Repair (Chapter 26M; pp.1080-1088).
Replication (Chapter 25M; pp.1036-1041).
Transcription (Chapter 27M; pp.1125-1142).
Translation (Chapter 28M; pp.1173-1187; 1196-1204; pp.1206).

Topic 4: **Lipids and Membranes**

Lipids, Membranes and Cellular Transport (Chapter 10M).

Topic 5: **Carbohydrates & Introductory Metabolism**

Carbohydrates (Chapter 9M).
Introduction to Carbohydrate Metabolism (Chapter 13M; Figure 13.1 and pp. 518-524 only).

Further Reading (NOT ON THE FINAL EXAM):

Citric Acid Cycle (Chapter 14; Figure 14.1, pp. 592-598);
Oxidative Phosphorylation (Chapter 15; Figure 15.1, pp. 625-628; 643-646).

Grade Breakdown:

Chem. 4571: Final grades are calculated as a weighted average of short "end-of-topic" quizzes or homework assignments, together with two midterm exams and a (non-cumulative) final lecture examination.

The grade breakdown is as follows:

- 10% quizzes and/or homework assignments
- 30% first lecture exam grade
- 30% second lecture exam grade
- 30% final lecture exam grade

Exams will be based on lecture and textbook materials and can include: true/false; multiple choice; and matching column type questions to test your factual knowledge and understanding of concepts. Additionally case/research studies may be used to provide the basis for examination questions. Please note that there are NO makeup quizzes or exams. For justified absences (e.g. unavoidable issues - official documentation is required) the first or second lecture exam score will count as the missed lecture exam grade. You will not receive a grade for the course if you miss two lecture exams or the final lecture exam. No "extra-credit projects" will be accepted. Letter grades for the course are determined using a curve if required. An averaged exam score for the course of ~70% usually establishes a "C" grade.

The deadline for students to apply for an online pass/fail elective rather than a letter grade for this course is **September 6th, 2021**. No requests will be supported following the deadline.

INC Grades:

If a student misses the final lecture examination due to a documented emergency, you **MUST** notify the lecturer **within 24-hours** of the final examination if you wish to receive an INC grade. **This assumes that all other course requirements have been satisfied and that you are intending to take a makeup final examination.** In the absence of student consultation with the instructor, you will be assigned a zero (0) on the final exam and this grade will be included in determination of the overall course grade. If you receive an INC grade you will need to contact your lecturer at the beginning of the semester following the course in order to determine the scheduled absentee makeup final exam date. You only have one semester to makeup the final exam.

Please note that the INC grade lapses to an FIN grade if you do not complete a makeup final examination by the deadline set by the University.

Honors (H) Designation for Chemistry 4571:

Please discuss the option with Professor Davenport if you are planning to take Chemistry 4571 for honors. Details of the requirements for this designation may be found on Blackboard. A letter grade of B or better is required in order to receive the Honors designation for this class. Please upload a copy of your selected research paper by midnight on **Wednesday, October 6th, 2021** using the "Assignments" folder found in Blackboard. After this deadline, the site will close and no papers will be accepted. The final research review paper, which is due electronically by midnight on **Wednesday, December 1st, 2021**, can also be uploaded electronically through the "Assignments" folder found in Blackboard.

Accommodations for Students with Disabilities:

In order to receive disability-related academic accommodations, students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect that they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell (vstewart@brooklyn.cuny.edu) at 718-951-5538 in Room 138 Roosevelt Hall. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Academic Integrity: The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for implementing that policy can be found at this site: <http://www.brooklyn.cuny.edu/bc/policies>. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member **MUST** report the violation. All students should read carefully and thoroughly the 2021-2022 Brooklyn College Bulletin for a complete listing of academic regulations of the College: (<http://www.brooklyn.cuny.edu/web/about/administrati on/enrollment/registrar/bulletins.php>).

Student Bereavement Policy: Students who experience the death of a loved one must contact the Division of Student Affairs, 2113 Boylan Hall, if they wish to implement either the Standard Bereavement Procedure or the Leave of Absence Bereavement Procedure: (<http://www.brooklyn.cuny.edu/web/about/initiatives/p olicies/bereavement.php>).

Non-Attendance Due to Religious Beliefs: The state law regarding non-attendance because of religious beliefs shall be followed as given in the 2021-2022 Brooklyn College Bulletin, Undergraduate Programs:

(<http://www.brooklyn.cuny.edu/web/about/administration/enrollment/registrar/bulletins.php>)