

## **BIOC12H: Biochemistry I: Proteins and Enzymes Fall 2021**

### **Description**

This course will cover the general structure and function of macromolecules in living organisms. However, the focus will be on the structure and function of proteins and the special class of proteins: enzymes. Analytical methods for proteins will be also discussed. Topics include: amino acids; the primary, secondary, tertiary and quaternary structures of proteins; protein motifs and domains; glycoproteins; membrane proteins; classical enzyme kinetics and allosteric enzymes; mechanisms of enzyme action.

**Prerequisites:** [[BIOB11H3](#) or (BIOB10Y3)] and [CHMB41H3](#)

### **Online live lectures**

Monday 13:00-15:00

Wednesday 11:00-12:00

Synchronous lectures will be given at the scheduled times via Zoom. The session ID and password will be posted on Quercus. Lectures will be recorded and posted in Media Gallery for later watch, but each recorded lecture will only last for 2 weeks and then be removed.

### **Notice of video recording and sharing (Download and re-use prohibited)**

This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

### **Instructor**

Dr. Rongmin Zhao; Office: SY248; Email: [rongmin.zhao@utoronto.ca](mailto:rongmin.zhao@utoronto.ca)

Please use E-mail ONLY when it is critical for you to get in touch with the instructor and use [BIOC12H-Biochemistry](#) in the subject line. Your student name and student number must be included in your email.

### **Office Hours**

Online office hours will be held on Monday 4-5pm. Please see course website for detailed information on how to access the office hour session.

### **Teaching Assistants**

We have two teaching assistants, Zachary Kileeg and Bona Mu. Their contact information will be posted on the course website. TAs will monitor online assignments, and act as cohosts during lecture time.

**Quercus.** TA also holds office hours after quizzes and term test to answer questions and for your test viewing. The schedule of TA office hours will be announced on the course website.

## Lecture Materials

The University of Toronto QUERCUS system will be used to support the course. You can log in from the website [q.utoronto.ca](http://q.utoronto.ca) with your UTORid. Lecture notes will be posted online prior to the lecture week either Friday or Saturday. However, lecture notes only allow you to follow the lectures easily, and some materials discussed in class may not be included in lecture notes. Any important information related to this course will be announced online and you are responsible to check the announcements regularly.

## Textbooks (required)

Fundamentals to Biochemistry by Voet et al the 5<sup>th</sup> edition will be used as textbook. Two types of access have been arranged and available from UTSC bookstore. Both come with the full access to WileyPlus that will be used for five online assignments.

- A) Fundamentals of Biochemistry 5<sup>th</sup> edition Loose-Leaf textbook plus WileyPLUS access (1 semester): **9781119661610** - \$139.00 CAD. This set includes both a physical loose-leaf textbook, plus a WileyPLUS code to use for the duration of the fall semester.
- B) Fundamentals of Biochemistry 5<sup>th</sup> edition WileyPLUS access only (1 semester): **9781119661450** - \$65 CAD (\$89 if not required component). This copy comes with access to WileyPLUS, students automatically get access to a full downloadable eTextbook for the duration of the fall term. You will also have access to additional study materials and auto-graded practice questions.

For your first time use of WileyPlus, you can access through the Wileyplus reading resources module. Follow the online information to register with your activation code.

## Course Evaluations

- Assignments (15%)
- Term test 1 (20%)
- Term test 2 (25%)
- Final examination (40%)

All assignments/tests/exams focus on concepts and the mechanism of processes. The test may include calculation and graphing questions, explanation of processes and interpretation of terms.

**Assignments (15%):** Five WileyPlus homework assignments, each worth of 3%. These assignments will be given in WileyPlus (very similar to Quercus). The information needed for WileyPlus access will be posted on the course website. Assignments are mostly multiple-choice, matching, or True/False questions. You are normally given five days or one week to finish the assignments. **There is no make-up or late submission permitted for all assignments.**

**Term tests (Test 1, 20%; Test 2, 25%):** There is no makeup term test.

If you miss term work (including term tests) due to illness you must **self-declare within 48 hours via Acorn**. Please note it is mandatory for you to fill in the notes field within the self-declaration tool on Acorn to specify what term work you are missing and applicable due dates to be considered. For some additional instructions on how to declare illness please review the following resource <https://help.acorn.utoronto.ca/blog/ufaq/how-do-i-declare-an-absence/>. If you are missing term work for another reason including: short-term illness under the care of a Physician or someone affiliated with Health and Wellness, disability reasons, a family death, vehicle accident, essential travel that is not vacation related, or varsity activities must e-mail the course instructor **and** Jennifer Campbell ([jac.campbell@utoronto.ca](mailto:jac.campbell@utoronto.ca)) in advance or within 48 hours of the term work due date. Please note all documentation will be verified for authenticity by Jennifer Campbell and any accommodations (if applicable) will be determined by the course instructor (Professor Zhao). If you have difficulties creating an absence declaration, please check the help links available on the department website: <https://www.utoronto.ca/biosci/node/389>

Please note that we understand that life happens and you may miss term work for valid reasons and we will help you navigate through those situations. Please remain in communication with our departmental admin office as well as your course's teaching team.

Once determined that you have the legitimate cause to miss the test, the following policy will be applied: if missing the first test, the weight will be combined to the second test; if missing the second, the weight will be combined to the final exam. However, if missing both, the first test will be treated as 0 and the weight of the second test will be combined to the final exam.

**Final examination (40%):** schedule will be arranged by the registrar office. Multiple choice and short answer questions.

Tips to answer short-answer questions: you could create your responses in a Word document and paste these into the Quercus Quiz text box (e.g., in case your Wi-fi connection is lost mid-way through the test/exam). Please note that Quercus does autosave but this is an additional recommendation.

**Special grading schema:** For students who take BIOC90 and plan to use the BIOC90 grades toward their final BIOC12 grades, their final BIOC12 grades will be calculated as followings: (final grade of BIOC12 out of 100) x 0.9 + (final grade of BIOC90 out of 10). See next section for more information about BIOC90.

### **BIOC90 Integrative Multimedia Documentary Project**

This course is one of several that can be used to fulfill the BIOC90 program requirement that all students in Biological Science specialist and major programs need to complete before graduation. If you decide to enroll in BIOC90 this semester, you can do so through Acorn – you will need to enroll before the course add/drop date. Please note that if you are enrolled in more than one of the C-level courses that can be used to fulfill this program, you will need to decide which course you want the 10% grade for BIOC90 applied to (you can only apply this grade to ONE of the participating C-levels).

Please see <https://www.utoronto.ca/biosci/biob90h3-bioc90h3> for a list of participating courses. It is your decision as to when you will complete BIOC90 (you do not need to do so this semester, but you do need to complete this course to graduate if you are enrolled in the most recent versions of our programs). If you end up taking BIOC90 at a time when you are not enrolled in any of the participating classes, you cannot benefit from the assignment grade in any way. If you are not sure if you need to take BIOC90 to complete your program, please consult degree explorer – it will show up as a program requirement if it is something you need to complete. Note: even if it is not one of your program requirements, you can still choose to complete this course if you wish to do so.

Under the ‘BIOC90 Module’ on our Quercus Page, the C90 course instructor will post all the information you will need to help you decide whether you want to take BIOC90 this term. Here, you will be able to find (i) the C90 course syllabus, as well as (ii) an information session held by the course instructor covering the details of the project.

### **Information Regarding AccessAbility Services at UTSC**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to contact with me and/or the AccessAbility Services Office as soon as possible. The UTSC AccessAbility Services staff (located in Room AA142) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. You can contact AccessAbility Services at 416-287-7560 or [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca).

### **Academic Integrity**

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student’s individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto’s Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- **IN PAPERS AND ASSIGNMENTS:** Using someone else’s ideas or words without appropriate acknowledgement; submitting your own work in more than one course without the permission of the instructor; making up sources or facts. Obtaining or providing unauthorized assistance on any assignment.
- **ON TESTS AND EXAMS:** Using or possessing unauthorized aids; looking at someone else’s answers during an exam or test; misrepresenting your identity.
- **IN ACADEMIC WORK:** Falsifying institutional documents or grades; Falsifying or altering any documentation required by the University, including (but not limited to) doctor’s notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from

other institutional resources (see <http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>).

### Tentative Lecture Schedule

Topics covered are listed in the table on the next page. This is a tentative schedule and the order may be changed later. Lecture notes will be posted weekly.

Lecture weeks	Tentative date	Topics (chapter sections)	Note
1	Sept 8 and 13	Introduction, basics of biochemistry, water, buffer, pH control, thermodynamics (1.3, 2.1, 2.2)	First class on Sept 8 <sup>th</sup> (Wednesday). Please double check your prerequisite for this course
2	Sept 15 and 20	Amino acids, protein primary structure (4.1, 4.2, 4.3)	
3	Sept 22 and 27	Protein analysis (5.1, 5.2, 5.3)	Sept 20, last day to adjust course load
4	Sept 29 and Oct 4	Protein secondary structures (6.1)	
5	Oct 6 and 18	High orders of protein structures (6.2, 6.3)	<b>Term test 1 (likely this week)</b>
	Oct 11	Reading week	Oct 11-Thanksgiving Day and reading week.
6	Oct 20 and 25	Protein folding and diseases (6.4, 6.5)	
7	Oct 27 and Nov 1	Important proteins (7.1, 7.3)	
8	Nov 3 and 8	Carbohydrate and glycoprotein (8.1, 8.2, 8.3)	
9	Nov 10 and 15	Lipid and membrane proteins (9.1, 9.2, 9.3, 9.4, selective information from ch10)	<b>Term test 2 (likely this week)</b>
10	Nov 17 and 22	Enzyme kinetics (12.1)	
11	Nov 24 and 29	Mechanism of action of enzymes (11.1, 11.2, 11.3, 11.5)	Nov 22, last day to drop F courses without academic penalty
12	Dec 1 and 6	Regulation of enzyme activity (12.2, 12.3, 12.4)	
13	Dec 6	Last class	Dec 6 Monday, last class
	Dec 7-8	Study break	
	Dec 9-21	Examination period	<b>Final exam is cumulative</b>