

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "[Dish With One Spoon](#)" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

---

## BIOCHEM 2EE3: Metabolism and Physiological Chemistry 2022 WINTER Term

**Instructor:** Dr. Caitlin Mullarkey | **E-mail:** [bioc2ee3@mcmaster.ca](mailto:bioc2ee3@mcmaster.ca) | **Office:** HSC 4H44

**Instructional Assistant:** Vivian Leong | **E-mail:** [bioc2ee3@mcmaster.ca](mailto:bioc2ee3@mcmaster.ca) | **Office:** HSC 1H6

**Please note for this course we will use the following email address for ALL questions and queries:**  
[bioc2ee3@mcmaster.ca](mailto:bioc2ee3@mcmaster.ca).

### Course Description

A brief introduction to proteins, enzymes and gene expression followed by a more detailed treatment of energy and intermediary metabolism with emphasis on physiological chemistry.

**Prerequisite(s):** One of CHEMBIO 2OG3, CHEM 2BA3, 2E03, 2OA3, 2OC3, 2OG3, HTHSCI 2D06 A/B, 2E03; or credit or registration in BIOPHYS 2S03 and registration in Honours Medical and Biological Physics (B.Sc.)

**Antirequisite(s):** BIOCHEM 3D03, LIFESCI 2EE3

Not open to students registered in an Honours Biochemistry (B.Sc.) or Honours Chemical Biology (B.Sc.) program.

### Course and Learning Objectives

#### Learning Objectives

**Upon completion of this course, the student will be able to:**

- Explain how structure relates to function
- Apply biochemical knowledge to the underlying mechanisms of systems function
- Describe the central pathways that provide an organism with energy
- Identify the applications of biochemical principles to health and society
- Execute the principles of laboratory-based research using virtual simulations

#### Class Activities:

---

**This course will be administered entirely online and asynchronously with the exceptions of exams. Descriptions of exam administration is detailed below.**

## Materials & Fees

### Required Materials/ Resources

- 1) Textbook: Lehninger Principles of Biochemistry, 8<sup>th</sup> Edition, David L. Nelson, Michael M. Cox, University of Wisconsin-Madison, MacMillan Learning, New York **AND** online access to the Achieve platform

Cost Hard copy + Achieve = \$88.00

Etext + Achieve = \$94.95

\*Please note that purchase of the textbook (hard copy or extext) is coupled with online access to Achieve which is required to complete homework assignments. You cannot purchase online access to Achieve alone.

- 2) Labster Virtual Simulations

Cost: \$65 for 6 months access. Voucher: Purchased through McMaster University Bookstore. For Labster each course has its own voucher code that is specific to each course, therefore you will need to purchase a new code for each course.

\*Important: You must use your McMaster email to sign up, as the email address will be used as your ID to export your marks from Labster to A2L.

- Both Labster access codes and Sapling Plus standalone access codes are non-refundable
- A free trial available for Achieve is available until the end of the add-drop period
- A free trial available for Labster is available until the end of the add-drop period

## Virtual Course Delivery

**To follow and participate in virtual classes it is expected that you have reliable access to the following:**

- A computer that meets performance requirements [found here](#).
- An internet connection that is fast enough to stream video.
- Computer accessories that enable class participation, such as a microphone, speakers and webcam when needed.

If you think that you will not be able to meet these requirements, please contact [uts@mcmaster.ca](mailto:uts@mcmaster.ca) as soon as you can. Please visit the [Technology Resources for Students page](#) for detailed requirements. If you use assistive technology or believe that our platforms might be a barrier to participating, please contact [Student Accessibility Services, sas@mcmaster.ca](#), for support.

## **Course Overview and Assessment**

**Topics (see next page)**

Week	Date	Time	Event(s)
1	Jan 9-16	Starts Jan 16 @ 12AM	<ul style="list-style-type: none"> <li>Module 1: Biochemistry and the cell</li> <li>Labster: Demo <u>and</u> Pipetting: Mastering the Techniques</li> <li>Labster 1</li> <li>Assignment: Module 1</li> </ul>
2	Jan 17-23	Starts Jan 17 @ 12AM	<ul style="list-style-type: none"> <li>Module 2: Water and non-covalent interactions</li> <li>Labster 2</li> <li>Assignment: Module 2</li> </ul>
3	Jan 24-30	Starts Jan 24 @ 12AM	<ul style="list-style-type: none"> <li>Module 3: DNA and protein basics</li> <li>Labster 3</li> <li>Assignment: Module 3</li> </ul>
4	Jan 31 <sup>st</sup> -Feb 6th	Starts Jan 31st @ 12AM	<ul style="list-style-type: none"> <li>Module 4: Protein structure-function</li> <li>Labster 4</li> <li>Assignment: Module 4</li> </ul>
5	Feb 7-13th	Starts Feb 7 @12AM	<ul style="list-style-type: none"> <li>Module 5: DNA replication and the central dogma</li> <li>Labster 5</li> </ul>
6	Feb 14-20th	Starts Feb 14 @12AM	<ul style="list-style-type: none"> <li>Module 6: Signal transduction and metabolism overview</li> <li>Labster 6</li> <li>Assignment: Module 6</li> </ul>
7	Feb 21-27 (Reading week)		<ul style="list-style-type: none"> <li>Revise Modules 1-5 for Test 1 continue to work on Module 6</li> </ul>
8	Feb 28 <sup>th</sup> -March 6th	Starts Feb 28 @ 12AM	<ul style="list-style-type: none"> <li>Module 7: Glycolysis, Gluconeogenesis and the Pentose Phosphate Pathway</li> <li>Labster 7</li> <li>Assignment: Module 7</li> </ul>
	Feb 28th	7 PM	Test 1: Modules 1-5; Administered on A2L using Respondus
9	March 7-13th	Starts March 7 @12AM	<ul style="list-style-type: none"> <li>Module 8: Citric Acid Cycle and Lipid Metabolism</li> <li>Labster 8</li> <li>Assignment: Module 8</li> </ul>
10	March 14-20th	Starts March 14 @12AM	<ul style="list-style-type: none"> <li>Module 9: Electron Transport Chain</li> <li>Labster 9</li> <li>Assignment: Module 9</li> </ul>
11	March 21-27th	Starts March 21 @12AM	<ul style="list-style-type: none"> <li>Module 10: Metabolism – pathway integration</li> <li>Labster 10: Your diet and your DNA</li> <li>Assignment: Module 10</li> </ul>
12	March 28-April 3rd		<ul style="list-style-type: none"> <li>No new modules -Revise Modules 6-10 for Test 2</li> </ul>
12	April 4-10th		<ul style="list-style-type: none"> <li>Finish homework and Labster assignments</li> </ul>
	April 4th	7 PM	Test 2: Modules 6-10; Administered on A2L using Respondus
	April 11 <sup>th</sup>	12:30 PM	Make-up exams Test 1 and Test 2
15	<b>April 12</b>	<b>Due Noon</b>	<b>Final Deadline for all homework and Labster assignments</b>

## Evaluation

Assessment Method	Weight
Homework Assignments (10 in total)	25%
Labster Simulations (10 in total)	25%
Test #1	25%
Test #2	25%
<b>Total</b>	<b>100%</b>

Test #1 and Test #2 are as scheduled as indicated on page 4. There are suggestion deadlines for Labster simulations and homework assignments but the final due date for these is April 12<sup>th</sup> at Noon.

### Requests for Relief for Missed Academic Term Work

[McMaster Student Absence Form \(MSAF\)](#): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

### MSAF Course Specific Information

#### Tests

Please note that Test 1 and Test 2 are worth 25%; therefore, student generated MSAFs (using the online self-reporting tool) will **NOT** be accepted. Students who miss a regularly scheduled test (i.e. Test 1 or Test) must obtain approval for an MSAF from the Office of the Associate Dean of their respective faculty and then write a make-up test on April 11<sup>th</sup>, 2021. Students who are required to write the make-up test, but miss it for a valid reason, may apply to the Office of their Associate Dean of their respective faculty for permission to write a deferred make-up test during the February Deferred Final Examination period. The student must submit a completed Request for Deferred Examination (Form B) to the Office of the Associate Dean of their respective faculty within one week of the final examination period.

#### Labster and Homework Assignments

The deadline for Homework and Labster assignments is April 12<sup>th</sup> at Noon (12 PM). Any assignment completed after this deadline will not be accepted (i.e. will receive a score of 0) without an MSAF. If an MSAF is submitted for outstanding homework and/or lab simulations the relief is a 3 day extension and the final deadline is Friday April 15<sup>th</sup> at noon (12 PM). Any assignment submitted after this extended deadline will not be accepted (i.e. will be scored as zero). Again, students are only entitled to the extended deadline if an MSAF has been submitted.

**It is your responsibility to follow up with the instructor (please e-mail [bioc2ee3@mcmaster.ca](mailto:bioc2ee3@mcmaster.ca)) within 48hrs of the stated deadline.**

### **Academic Accommodation of Students with Disabilities**

Students with disabilities who require academic accommodation must contact [Student Accessibility Services \(SAS\)](#) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities](#) policy.

### **Academic Accommodation for Religious, Indigenous Or Spiritual Observances (Riso)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

### **Courses with An On-Line Element**

**Some courses may** use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

### **Online Proctoring**

**This course will** use online proctoring software for Test 1 and Test 2. This software requires students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software will be required to be installed before the test/exam begins. The use of this software is **MANDATORY** (except in the case of SAS accommodations). Please make a note of the test dates. You must procure a webcam or secure an arrangement to use a computer with a webcam for these dates and times. Homework and Labster assessments will not use this proctoring software.

## Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

**It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](#).

**The following illustrates only three forms of academic dishonesty:**

- plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

## Authenticity / Plagiarism Detection

**Some courses may** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to the [McMaster Office of Academic Integrity’s](#) webpage.

## Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities \(the “Code”\)](#). All students

share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

### **Copyright and Recording**

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

### **Research Ethics -N/A**

### **Extreme Circumstances**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.