

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 2024 Winter Term

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Contents

ALL questions and queries: bioc2ee3@mcmaster.ca	1
Course and Learning Objectives	2
Learning Objectives	2
Upon completion of this course, the student will be able to:.....	2
Class Activities:	2
Virtual Course Delivery.....	3
To follow and participate in virtual classes it is expected that you have reliable access to the following:.....	3
Course Overview and Assessment	3
Topics (see next page).....	3
Requests for Relief for Missed Academic Term Work	2
MSAF Course Specific Information	2
TEST	2
Homework Assignments.....	2
Academic Accommodation of Students with Disabilities (SAS)	3
Courses with An On-Line Element.....	3
Online Proctoring.....	4
Academic Integrity	4
It is your responsibility to understand what constitutes academic dishonesty.....	4
The following illustrates only three forms of academic dishonesty:	4
Authenticity / Plagiarism Detection	4
Conduct Expectations.....	5
Statement on the use of Generative Artificial Intelligence in the course.....	5
Copyright and Recording.....	5
Research Ethics -N/A	6
Extreme Circumstances.....	6

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 test and the final exam. Descriptions of test and final exam administration is detailed below.

Materials & Fees

Required Materials/ Resources

- ❖ **The deadline for Student Inclusive Access options (opt out, opt back or opt in) is Jan 19, 2024**

A detailed email will be sent to your McMaster email address prior to the start of the course, and the pdf version is available in A2L.

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

- Etext + Achieve cost = \$102.95
- Optional: ONLY for those who remain registered in the course, they may choose to buy an add on loose leaf printed text (partial) = \$ 37.95. Please contact bookstore for details.

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 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.

An optional introduction lecture will be given on Tuesday January 9th, 2024 @7PM. This will be recorded and uploaded to A2L if you are unable to attend.

Course Overview and Assessment

Topics (see next page)

Week	Suggested Module start dates	Module available	Event(s)
1	Jan 8-14	Jan 8 @ 12AM	<ul style="list-style-type: none"> Module 1: Biochemistry and the cell Assignment: Module 1
2	Jan 15-21	Jan 8 @ 12AM	<ul style="list-style-type: none"> Module 2: Water and non-covalent interactions Assignment: Module 2
3	Jan 22-28	Jan 8 @ 12AM	<ul style="list-style-type: none"> Module 3: DNA and protein basics Assignment: Module 3
4	Jan 29-Feb 4	Jan 8 @ 12AM	<ul style="list-style-type: none"> Module 4: Protein structure-function Assignment: Module 4
5	Feb 5-11	Jan 8 @ 12AM	<ul style="list-style-type: none"> Module 5: DNA replication and the central dogma Assignment: Module 5
6	Feb 12-18	Feb 12 @12AM	<ul style="list-style-type: none"> Module 6: Signal transduction and metabolism overview Assignment: Module 6
	Feb 19-25 (Reading week)		Revise Modules 1-5 for Test continue to work on Module 6
7	Feb 26- March 3	Feb 12 @12AM	<ul style="list-style-type: none"> Module 7: Glycolysis, Gluconeogenesis and the Pentose Phosphate Pathway Assignment: Module 7
	Tuesday Feb 27	7-8:30 PM 90 min total	<p style="text-align: center;">TEST Modules 1-5</p> <p>Administered on A2L using proctorial software Respondus</p>
8	March 4-10	Feb 12 @12AM	<ul style="list-style-type: none"> Module 8: Citric Acid Cycle and Lipid Metabolism Assignment: Module 8
9	March 11-17	Feb 12 @12AM	<ul style="list-style-type: none"> Module 9: Electron Transport Chain Assignment: Module 9
10	March 18-24	Feb 12 @12AM	<ul style="list-style-type: none"> Module 10: Metabolism – pathway integration Assignment: Module 10
11	March 25- March 31		<ul style="list-style-type: none"> No new modules -Revise Modules 1-10 and finish all assignments
12	Tuesday, April 2	Due 11:59 PM	Final Deadline for all homework assignments
	April 11	12 PM – 1:30 PM 90 min total	<p style="text-align: center;">Make-up test for Test (Modules 1-5)</p> <p>Administered on A2L using proctorial software Respondus</p>
	TBD by Examination office	Scheduled by University during Winter 2024 examination time	<p style="text-align: center;">IN PERSON FINAL EXAM Modules 1-10</p>

Evaluation

Assessment Method	Weight
Homework Assignments (10 in total), final due date is April 2 at 11:59 PM	30%
Test (On-line with proctoring) on Feb 27 at 7:00 – 8:30 PM	30%
Cumulative Final Exam (In-person during Final Exam Period)	40%
Total	100%

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

TEST

Please note that Test is worth 30%; therefore, student generated Type A MSAF (using the online self-reporting tool) will NOT be accepted. Students who miss a regularly scheduled test must obtain approval for a Type B MSAF from the Office of the Associate Dean of their respective faculty and then write a **make-up test on April 11 at 12 PM**. 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 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.

Homework Assignments

Please note that Homework assignment is worth 30% in total. Each assignment is worth 3%, and there is a total of 10. The deadline for **ALL** homework assignments is **Tuesday, April 2 at 11:59 PM**. Any individual assignment completed after this deadline will not be accepted (i.e. will receive a score of 0 for the unfinished homework assignments) without an MSAF.

- **8 or less assignment missed (25% or less):** you will need Type A self-generated MSAF from Mosaic
- **9 and up assignment missed (25% and up):** you will need a Type B MSAF submitted via your Faculty office as it has exceed 25% of the total work of the course.

The relief is a 3 days extension and the final deadline is Friday, April 5 at 11:59 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 and approved by the Faculty office. **It is your responsibility to follow up with the instructor (please e-mail bioc2ee3@mcmaster.ca) within 48 hrs of the stated deadline.**

Academic Accommodation of Students with Disabilities (SAS)

Students with disabilities who require academic accommodation must contact [Student Accessibility Services \(SAS\)](#) at 905-525-9140 ext. 28652 or 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. 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 assessments will not use this proctoring software.

Academic Integrity

You are expected to exhibit honesty and use ethical behavior 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 behavior 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 homework, 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](#)

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 behaviors 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.

Statement on the use of Generative Artificial Intelligence in the course

You will not be permitted to use generative AI in this course. In alignment with [McMaster academic integrity policy](#), it "shall be an offence knowingly to ... submit academic work for assessment that was purchased or acquired from another source". This includes work created by generative AI tools. Also stated in the policy is the following: "Contract Cheating is the act of "outsourcing of student work to third parties" (Lancaster & Clarke, 2016, p. 639) with or without payment". Using Generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

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.

