

Course Details

Course Title & Number: CHEM 2750 Elements of Biochemistry 2

Term and Year: Winter, 2022

Number of Credit Hours: 3 Cr

Prerequisites: One of CHEM 2730, CHEM 2700, CHEM 2701, the former CHEM 2770, the former CHEM 2360, the former CHEM 2361, the former CHEM 2860, MBIO 2730, MBIO 2700, MBIO 2701, the former MBIO 2770, the former MBIO 2360, or the former MBIO 2361

Instructor Contact Information

Instructor(s) Name & Preferred Form of Address: Dr. Irene Fakankun
Dr. Fakankun/ Dr. Irene

Office Hours or Availability: Virtually by appointment

Email: Irene.fakankun@umanitoba.ca
I read and respond to emails daily Mon-Fri evenings. Expect a response to your emails within 48 hours of their receipt.

Contact: Primary information portal for this course will be on UM Learn. General questions will be answered on the portal and specific questions/communication can be sent via email. Please do not send me emails over the weekend as they may not be read until Monday.

Course Description

General Course Description

The continuation of [CHEM 2730/MBIO 2730](#), dealing with nitrogen and lipid metabolism, representative biosynthetic pathways, and synthesis and importance of DNA, RNA and proteins. Primarily for students in Agricultural and Food Sciences and four-year Biological Sciences programs in Science. May not be used as part of an Honours, Major, or Minor program in Chemistry. May not be used as part of an Honours or Major program in Microbiology. This course is also given in Microbiology as [MBIO 2750](#). May not be held with the former [CHEM 2370](#), the former [CHEM 2371](#), [CHEM 2710](#), [CHEM 2711](#), the former [CHEM 2780](#), the former [MBIO 2370](#), the former [MBIO 2371](#), [MBIO 2710](#), [MBIO 2711](#), [MBIO 2750](#), or the former [MBIO 2780](#).

Course Lecture Topics

Organization and structure of metabolic pathways:

- bioenergetics
- general background information about pathways (Ch. 15)
- mitochondrial electron transport Chain (Ch. 20 and 21)

Photosynthesis:

- light reactions (Ch 22)
- calvin cycle (Ch 23)

TCA Cycle and Carbohydrate Metabolism:

- review of glycolysis and TCA (Ch. 16, 18 and 19)
- gluconeogenesis (Ch 17)
- glycogen metabolism (Ch. 24 and 25)
- pentose phosphate pathway (Ch. 26)

Lipid Metabolism:

- fatty acid degradation and β -oxidation (Ch 27)
- fatty acid synthesis (Ch 28)
- cholesterol and hormone synthesis (Ch 29)
- regulation of lipid metabolism

Nitrogen Metabolism:

- nitrogen fixation (Ch 31)
- amino acid catabolism and the urea cycle (Ch 30)
- amino acid synthesis (Ch 31)
- nucleotide metabolism (Ch 32)

Integrated metabolism

DNA replication and repair

- DNA replication (Ch. 34)
- DNA repair (Ch. 35)

RNA and transcription

- RNA Synthesis and RNA processing (Ch. 36)

Protein synthesis

- Genetic code (Ch. 39)
- Protein synthesis (Ch 40)

Several additional lecture slots are held in reserve for review.

Course Materials and Technology

Required textbook – Tymoczko J.L. *et al*, 2019 Biochemistry, A short course, 4th Edition, W. H. Freeman Publishers.

Online materials can be accessed through the UM Learn A01 section for this course using the sapling link on the content page, or it can be accessed at: <https://sites.google.com/macmillan.com/chem2780w20nichols/home>

Be aware of copyright laws when using readings. http://umanitoba.ca/copyright/copyright_basics.html

Course Technological Requirements

Students enrolled in the course must ensure they satisfy the following minimum technological requirements:

- A computing device where one can create and edit documents,
- An internet connection capable of streaming videos and downloading software, and
- Access to a web-cam and microphone.

Timeline for electronic inquiry response:

Please be respectful of the specific reply timelines that faculty members or staff members set for your course. Generally, when a faculty member or staff member receives an electronic inquiry from you they will try to reply within one or two business days of receipt of the email. It is understood that sometimes the reply may come sooner or in some instances later than this, with a normal response envelope between 1-3 business days.

COURSE ASSESSMENT

Test/Examination Schedule and Evaluation

Mid-term test: 30 % of total marks. 9th March – 7-9PM CST

Assignments: 20 % of total marks (four assignments in total)

Cumulative Final Exam: 50 % of total marks. Scheduled by the Registrar's office.

- Details of mid-term tests format will be posted on UM Learn
- Assignments are open book and details will be communicated on UM Learn
- Assignments are due on due date which will be posted on UM Learn.
- Assignment submissions are expected electronically on UM Learn
- To facilitate prompt return of marked assignments (and answers), late assignments will not be accepted. Assignments that are not submitted by the due date will be assigned a grade of "0".
- If a student misses an assignment, or the term test for a valid reason (illness, etc.), the marks will be allocated to the final exam.

Grading

A final letter grade will be assigned based on your final percentage grade as follows:

Percentage Score	Letter Grade	Grade Value	Point
90.0-100	A+	4.5	
80.0 – 89.9	A	4.0	
75.0 – 79.9	B+	3.5	
70.0-74.9	B	3.0	
65.0-69.9	C+	2.5	
55.0-64.9	C	2.0	
50.0-54.9	D	1.0	
00.0-49.9	F	0.0	

EXPECTATIONS AND POLICIES

I EXPECT YOU TO:

Lectures

January 24 2022 – April 25, 2022

Monday, Wednesday & Friday 12:30 – 1:20 PM

Remote Learning

Lectures will be delivered live on Zoom except when otherwise announced. Lectures will also be recorded and available on UM Learn for at least 48 hours following the live lecture.

Please note that you are not permitted to record lectures without my express permission. Note that the material in lectures (my ppts, my notes, and the images from the textbook) are protected by copyright and should not be posted on any public website. *No audio or video recording of this material, lectures, or presentations is allowed in any format, openly or surreptitiously, in whole or in part without my permission. Course materials (both paper and digital) are for the participant's private study and research and must not be shared. Violation of these and other Academic Integrity principles, will lead to serious disciplinary action*

All lecture materials will be made available for student access through the UM Learn website. Please note that material presented in class will take precedence over all other material.

Attendance is encouraged

Participation in class through class polls is encouraged

February 28th 2022 — April 25, 2022

The University of Manitoba is planning a full return to in-person instruction beginning on February 28th 2022 and continuing for the remainder of the Winter Term. Additional information will be provided from the Provost's office in early February 2022.

Professional Conduct

We recognize that these are unusual circumstances, and some adjustments need to be made when working virtually. At the same time, we do want to remind you that University policies, such as the **Respectful Work and Learning Environment policy**, still apply, as do basic expectations around how students will engage with each other and all members of the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being properly clothed, not being impaired, and participating respectfully. **Essentially, if you wouldn't do it in an in-person class, don't do it in a virtual setting.**

Please familiarize yourself with the [UM Respectful Work and Learning Environment \(RWLE\)](#)

Section 2.5(c) of the [Student Non-Academic Misconduct and Concerning Behaviour Procedure](#) describes types of inappropriate or disruptive behaviour.

Class Communication:

You are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy: http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html

Student Accessibility Services:

The University of Manitoba is committed to providing an accessible academic community. [Students Accessibility Services \(SAS\)](#) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services

520 University Centre

Phone: (204) 474-7423

Email: Student_accessibility@umanitoba.ca

Medical Notes

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines, if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;
- Contact an advisor in your faculty of registration for a missed final exam (scheduled in the final examination period);
- Inform your instructor/advisor as soon as possible, do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam.
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed within 48 hours of the date of the missed examination.

Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or [accessibility-related accommodations](#)). Students are advised to speak with an [advisor in their faculty/college/school of registration](#) in this case.

COVID 19:

The University of Manitoba (the “UM”) is committed to maintaining a safe learning environment for all students, faculty, and staff. Should campus operations change because of health concerns related to the COVID-19 pandemic or other campus-wide emergency, it is possible that this course will move to a fully remote delivery format. Should the instructor be required to stay at home for an extended period and an alternate instructor not be available, the course may move temporarily to a remote delivery format. In that instance, you may be provided with an asynchronous option to minimize the impact the change may have on your schedule.

PPE and Mask Wearing

In a face-to-face environment, our commitment to safety requires students to observe all physical distancing (2m) and personal protective equipment (PPE) guidelines set by the University (<https://umanitoba.ca/coronavirus>)

While on campus and in class, you must wear PPE (Personal Protective Equipment) as stipulated in current [University policies, procedures, and guidelines](#). Students who fail to comply are subject to disciplinary action in accordance with the [Student Discipline Bylaw](#) and the [Non-Academic Misconduct and Concerning Behaviour Procedure](#).

Medical-grade 3-ply masks are available at many locations on campus, including specific classroom locations, designated by your unit, the Elizabeth Dafoe Library (Fort Garry Campus) and the Brodie Centre main doors (Bannatyne Campus). Additional PPE, if necessary for a specific learning environment, will be provided to you by the teaching unit.

If you do not follow masking and other requirements you will be asked to leave the learning space and may only return to the class already in progress when you have complied with these requirements. Repeated issues will result in disciplinary action as previously noted.

Students should not eat or drink during class time. Illness

Remember: **STAY HOME IF YOU HAVE SYMPTOMS OR ARE ILL.** If you become sick or are required to self-isolate you should notify your instructor by email so you can develop a plan to complete the course learning outcomes while you are absent.

If you have symptoms, do not come to campus or any UM facilities. Complete the [self-assessment](#) on the Manitoba Public Health site and follow the guidelines, which may include booking a COVID-19 test.

What to do if you become ill while at UM:

1. Leave the classroom, lab or workspace immediately. Continue to wear your mask while leaving the premises and/or while waiting for transportation
2. Perform hand hygiene (soap and water or hand sanitizer) and avoid contact with others and minimize contact with the physical environment.
3. Once at home, complete the [MB self-assessment](#) and follow the directions that are provided.
4. Inform your supervisor(s), instructor(s) or, if in residence, the appropriate individual.
5. You must remain off campus and all UM facilities until cleared to return in accordance with self-assessment, testing results, or MB Health requirements.

Recommended transportation options (in order):

1. Drive yourself home.
2. Pick-up by family or friend – remember to keep your mask on and to distance as much as possible, and where possible, open a window to improve ventilation.
3. Pickup by taxi/Uber:
 - Remain masked and perform hand hygiene before entering the vehicle.
 - o Avoid touching the inside of the vehicle
 - o Keep your mask on for the duration of the ride
 - o Where possible, open a window to improve ventilation.
4. Winnipeg Transit buses - Winnipeg Transit has indicated that individuals that are ill **must not use Transit.**

Privacy Concerns

This course is delivered remotely using a video conferencing platform, and you may be required to install University approved software on your device and you may be required to have and use a webcam. During videoconferencing, your personal information, in the form of your name, image, and any questions or answers you pose during classes, may be collected under the authority of The University of Manitoba Act. The information you provide will be used by the University for the purpose of supporting student learning.

Voluntary Withdrawal (VW), Authorized Withdrawal (AW) And Limited Access Policies

Here are some important dates from the [Registrar's Office](#):

- **Apr. 25, 2022**

VW Date for Winter Term courses

VW: Students have the opportunity to voluntarily withdraw (VW) from this class up to April 25, 2022. By then, you will have received feedback to allow you to assess your progress and determine if you are achieving the grade you are aiming for in this course. If you are unlikely to be successful in the course, or you are not achieving the grade that you are aiming for, you should consider a VW from the course. You may contact me to review your progress in more detail, or you may discuss the VW option with a Faculty academic advisor. Students enrolled in the course after the VW deadline will be assigned a final grade.

http://umanitoba.ca/u1/know_yourself/573.html

AW: At times medical or compassionate circumstances arise in a student's life that prevent them from performing as they would in normal circumstances. If you are in this position, please contact a Faculty academic advisor to discuss your options. Be prepared to provide documentation, which supports your situation.

http://www.umanitoba.ca/student/resource/student_advocacy/authorized-withdrawal/index.html

Limited Access Policy: The Senate Executive Committee approved, on behalf of Senate that section 2.5(a) of the Repeated Course Policy to be suspended indefinitely. Sec 2.5 refers to Limited Access. Suspension of LAP means that you can retake the course you have decided to VW in the next semester.

Academic Integrity

Academic integrity is taking responsibility for and being honest with your work and respecting the work of others. Since you are a member of the university community, we want you to learn what that responsibility and honesty entails and how we respect the work of others.

The Faculty of Science continues to uphold high standards of academic integrity. We know that you, our students, support us in this and we count on each and every one of you to do your part. We will continue to ensure no one is using Covid-19 circumstances as a means to gain an unfair advantage over their fellow students. Thus, as with standard in-person examinations, we expect all students to strictly adhere to instructions from their professors regarding what resources can and cannot be used during the exams, to follow other rules the professors wish to set, and to adhere to the academic conduct standards of the University and Faculty.

To aid professors in assuring that all forms of assessments have been administered fairly, the University will be electronically monitoring all tests, quizzes and examinations, included, but not limited to overseeing chat-rooms, relevant predatory web-sites and, in so doing, we will analyze scholastic evidence of individual exams.

Please view information with regards to academic integrity: **be aware; be proactive; be smart and be honest.**

Academic Integrity Message from Associate Dean Krystyna Koczanski: <https://youtu.be/Ok-lilm4SeE>

The Student Discipline By-Law may be accessed at:

http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2009_01_01.pdf

The list of suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty is available on the Faculty of Science webpage:

http://umanitoba.ca/faculties/science/resources/Acad_Dishon_TABLE_RevCSS_AdminC_Jul2012_WEB.pdf

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.

<https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View>

How to succeed in your science courses?

The Faculty of Science is committed to delivering the high quality education our students have come to expect. We also want to ensure that you set yourself up for success. We want you to succeed!

#1. We recommend that you consider the stated requirements of this course.....

While we are making reasonable accommodations for students, you will want to plan ahead accordingly and be flexible.

#2. Use the [Registration Revision Period](#) (Sept.8-22, 2021) to evaluate the course syllabus, and the course content. Some courses will have interactive activities and assessments such as tutorials, online labs, and online quizzes at scheduled times throughout the term in addition to/in lieu of examinations. Make sure that your current situation will allow you to participate in all courses to the fullest. *This is particularly important for students who will be joining us from different time zones.*

Some courses may have a mandatory on-campus component. Student safety is very important to us and the University of Manitoba, operating in close collaboration with Manitoba Public Health, has authorized these components. The primary aim of our in-person components is to maximize the education and training of our students whose future is at risk without it. The University of Manitoba is implementing many safety measures to ensure the safety of students and staff while on campus, such as requiring face masks (three-ply disposable ones), proper hand hygiene, physical distancing, and sanitation of high-touch surfaces with ethanol solution or disinfectant wipes to help mitigate the risks associated with contracting COVID-19.

If you know that you will be unable to participate in an on-campus component because, for example, you are not currently in Winnipeg and are unable to come to Winnipeg, you, or someone you live with, is immunocompromised, or you are simply uncomfortable with attending, you are strongly urged to withdraw from the course during the Registration Revision Period.

Note: *during the registration revision period you will be able to drop/add courses without any financial consequence.* Speak directly with instructors if you have any questions specific to their course.

#3. Take time to consider the workload associated with the course schedule you are planning. Remote learning has its challenges and your ability to adapt and be flexible in this context is very important. Be realistic about other commitments and distractions that are part of everyday life, and make your course selection decisions accordingly. If you want to discuss anything, the academic advisors are available – email: sciadv@umanitoba.ca to request an appointment.

LEARNER SUPPORT

Writing and Learning Support

The Academic Learning Centre (ALC) offers writing and learning supports to help you throughout your academic program. These supports are offered online during the Covid-19 pandemic.

Make an appointment with an ALC writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a

draft. The ALC also has an English as an Additional Language (EAL) specialist available to work with students on improving their English-language academic writing skills.

Consult an ALC learning specialist or attend an academic skills workshop to improve your time management, learning strategies and test-taking strategies. Get support in select courses by making an appointment with an ALC content tutor. The ALC also offers peer-facilitated study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In SI study groups, students ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

In addition to one-to-one and group sessions, you can also find writing and study tip sheets and videos on the ALC website.

Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

Contact the Academic Learning Centre by calling 204-480-1481 or emailing academic_learning@umanitoba.ca.

University of Manitoba Libraries (UML)

Research begins at [UM Libraries](#). [Learn at the Libraries](#) is a great place to start, with information for students on academic writing, how to search the library, evaluating resources, and writing citations. As the primary contact for all research needs, your [liaison librarian](#) can play a vital role when completing academic papers and assignments. Liaisons can answer questions about locating appropriate resources or managing citations, and will address any other concerns you may have regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you online. When working remotely, students can also receive help online through [Ask Us!](#) chat. For further detail about the libraries' services and collections, [visit the Libraries' web site](#). Regularly check our [COVID-19 Update](#) page for available library services and access to resources for Fall 2021.

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:* <http://umanitoba.ca/student/counselling/index.html>

474 UMSU University Centre or S211 Medical Services Building

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

<http://umanitoba.ca/student/case-manager/index.html>

520 UMSU University Centre

(204) 474-7423 (Student Support Intake Assistant)

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are seeking information on health topics, including physical and mental health concerns, alcohol and substance use harms, or sexual violence. You can also access peer support from a *Healthy U* peer health educator.

Health and Wellness Educator

<https://umanitoba.ca/student/health-wellness/welcome-about.html>

britt.harvey@umanitoba.ca

469 UMSU University Centre

(204) 295-9032

Sexual Violence Resource Centre (SVRC)

Contact SVRC if you have experienced sexual violence or are seeking information about how to help somebody else. SVRC provides inclusive, survivor-centred, trauma-informed services, such as consultation, referrals, safety planning, and a range of on-site supports, including counselling by Klinik.

Sexual Violence Resource Centre

<https://umanitoba.ca/student-supports/sexual-violence-support-and-education>

svrc@umanitoba.ca

537 UMSU University Centre

(204) 474-6562 (Sexual Violence Intake and Triage Specialist)

Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

Grade Appeals

If you have questions about your grades, talk to me. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>

Academic Integrity

You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the Academic Integrity regulation. Consult the course syllabus or me for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the Student Academic Misconduct procedure for more information.

Violent or Threatening Behaviour
http://umanitoba.ca/admin/governance/governing_documents/community/669.html

Sexual Assault

If you experience Sexual Assault or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The Sexual Assault policy may be found at: http://umanitoba.ca/admin/governance/governing_documents/community/230.html

More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>

Intellectual Property

For information about rights and responsibilities regarding Intellectual Property view the policy: https://umanitoba.ca/admin/governance/governing_documents/community/235.html

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Academic Program Questions

Contact an Academic Advisor within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns. <http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. University guidelines state that copyrighted works, including those created by instructors of the course are made available for private study and research and must not be distributed in any format without permission. Since it is illegal, do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca