



BIOC*4580 Membrane Biochemistry

Winter 2021

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 07, 2021

1 Course Details

1.1 Calendar Description

This course is a molecular examination of the structure and functions of cell membranes, cell surfaces and associated structures. Topics may include: membrane lipids; membrane protein structure; membrane transporters; ATP production; cytoskeleton; cell surface carbohydrates; membrane biogenesis; signal transduction.

Pre-Requisites: BIOC*3560 or BIOC*3570

1.2 Course Description

We will (a) discuss structure-function relationships of membrane proteins, lipids, & carbohydrates; (b) explain the molecular basis and integrate data to explain cell physiology; (c) explore experimental tools of biochemistry, molecular biology, cell biology, and biophysics; (d) apply this knowledge to problems & new situations. A variety of teaching methods will be employed, including active learning, group work, and lectures, with regular homework and reading assigned.

1.3 Timetable

PLEASE NOTE: ALL TIMES REPORTED ARE **EASTERN TIME** (GUELPH, ONTARIO, CANADA).

Live (synchronous) virtual classes during scheduled class times on Monday, Wednesday, & Friday 9h30-10h20 using Zoom.

After each lecture, a recording of the lecture will be posted to Courselink for asynchronous viewing by students.

1.4 Final Exam

Fri, Apr 23, 11:30 AM - 1:30 PM

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	John Dawson
Email:	jdawso01@uoguelph.ca
Office:	virtually, using Zoom
Office Hours:	Virtual office hours will be held immediately following classes on Monday and Wednesday, using Zoom. Simply stay in the Zoom meeting for the class to ask your class or online reading related questions!
Instructor:	Dr. Enoka Wijekoon
Email:	ewijekoo@uoguelph.ca
Telephone:	+1-519-824-4120 x56095
Office:	SC1 3517
Office Hours:	Mon and Wed 1:00 - 2:30 PM

3 Learning Resources

3.1 Required Resources

Courselink (Website)

<https://courselink.uoguelph.ca>

- The **course outline, lecture schedule, links to Zoom classes, class recordings** and **reading list** for homework are available at this site. The **lecture notes** will be available before each lecture.
- Material will be posted as pdf files, which can be viewed and printed using Adobe Acrobat Reader.
- **Dropboxes** are used to collect and evaluate individual and group work.
- **Quizzes** and the **Final exam** will all be administered through CourseLink

Zoom (Software)

<https://zoom.us>

We will be using Zoom for the live classes in this course. The application is more stable than the web-based version of the program including the seamless use of break-out rooms,

polls, and annotation, all of which will be used in this class.

3.2 Recommended Resources

Office365 (Software)

<https://guelph.onthehub.com/WebStore/Welcome.aspx>

It is highly recommended that students have access to this software suite to complete course assignments requiring word processing, spreadsheet, and data analysis capabilities.

If students use other similar software, please ensure that you save your files in the required file format according to the assignment instructions.

High Speed Internet (Equipment)

Although high speed connection to the internet is not required, it is highly recommended so that a better online experience with the tools, videos, and other materials used in the course can be achieved.

Lehninger Principles of Biochemistry (Textbook)

- "Lehninger Principles of Biochemistry" by Nelson & Cox (6th edition, 2013)
- This is an excellent text for many senior level courses in biochemistry and other molecular bioscience fields, and is also very useful as a reference text at the graduate level. A course reading list is provided for this textbook. Copies of this book are on 2-hour Reserve in the McLibrary, as well as in the stacks, and it is available for sale in the Campus Bookstore. The 5th edition (2008) of this book is still very useful, whereas the 4th edition (2005) will not contain the new structural and proteomics information that has become available in the past few years.

3.3 Additional Resources

An Introduction to Biological Membranes (Textbook)

- William Stillwell. AN INTRODUCTION TO BIOLOGICAL MEMBRANES: From Bilayers to Rafts. Elsevier - Academic Press (2013).
- This textbook has appeared in open-access in the fall of 2013. I have made the pdf available on-line. It appears to cover the course material broadly if not in-depth, and may be helpful as additional reading.

Membrane Structural Biology (Textbook)

- M Luckey. Membrane Structural Biology. Cambridge, 2008. QH 601.L75
- Also available from the Library or TUG-Online

3.4 Assigned & Interesting Readings

We assign readings from the internet throughout the course:

1. regular homework readings to PREPARE for active learning in the classroom
2. review or primary experimental papers from the literature related lecture material to APPLY YOUR KNOWLEDGE to problems and new situations.

3.4 In class use of electronics

Some lessons require the use of internet-enabled devices to research information during classtime. We may also be using services such as GoogleDrive, OneDrive or Twitter to collect class information in lessons or outside of class.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. The student will show a detailed understanding of cell membranes, cell surfaces, and associated structures by:
 - 1) Understanding the structures, functional roles and biogenesis pathways of the major components of the membrane - lipids, carbohydrates and proteins;
 - 2) Explaining the molecular basis of the biochemical behaviours of membranes, and showing how these behaviours in turn explain key aspects of cellular physiology;
 - 3) Understanding the experimental approaches and tools used to investigate membrane systems;
 - 4) Understanding the role of the membrane in transport and signal transduction;
 - 5) Understanding the organization and role of the cytoskeleton and extra-cellular matrix;

6) Being able to apply this knowledge to new problems & situations.

Students will also practice working in teams in the classroom to gather information and apply knowledge to new data in preparation for assessments.

5 Teaching and Learning Activities

5.1 Active Learning Classes

Some of the topics will be explored through **active learning** techniques:

- where students review the content BEFORE class.
- IN CLASS, students analyze primary literature in groups
- students answer questions that apply the content reviewed to the research in groups.
 - Answers are submitted to a Dropbox on CourseLink
- new groups are formed and another paper and set of questions are answered
 - Answers are submitted to a Dropbox on CourseLink
- AFTER class, the answers to questions are reviewed by the instructor / TA to provide feedback to the students

The focus of this approach is to further develop **self-directed learning** (before class), **working in teams** (during class) and **preparation for assessment**, since the content and types of questions addressed in class are assessed on exams.

5.2 Feedback and Review

A variety of feedback and review activities will be used:

1. weekly feedback regarding concepts and check-ins with each other to determine challenging ideas and support each other
 2. in-class Kahoot! competitions.
 3. study questions pertaining to the material.
 4. The review sessions are an opportunity to discuss the topics to be examined in the class.
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6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
In-Class Quiz 1	20
In-Class Quiz 2	20
In-Class Quiz 3	25
Final Examination (Cumulative)	35
Total	100

6.2 Assessment Details

In-Class Quiz 1 (20%)

Date: Fri, Jan 29, CourseLink Quiz

Content from lectures 1-8

In-Class Quiz 2 (20%)

Date: Wed, Mar 3, CourseLink Quiz

Content from lectures 10-17

In-class Quiz 3 (25%)

Date: Fri, Mar 19, CourseLink Quiz

Content from lectures 19-26

Final Examination (Cumulative) (35%)

Date: Fri, Apr 23, 11:30 AM - 1:30 PM

Content from all classes and readings.

6.3 Quizzes

- A set of questions on material covered in a designated block of lectures. These will be written during a class period, and will be of 45 minutes duration and are **closed-book**. Students who foresee potential problems with any of the scheduled dates must contact the instructor as soon as possible. If quizzes are missed

because of **illness or other valid reasons such as compassionate considerations**, the marks allotted for that quiz will be transferred to the final examination. Make-up quizzes will not be provided. **Quizzes missed for no valid reason will result in a grade of zero.**

- **Internet problems during a quiz:**

1. **If you experience internet problems** or CourseLink problems during a Quiz:

- Contact CourseLink Support immediately:
Phone: 519-824-4120 ext. 56939
Toll Free: 1-866-275-1478
Email: courselink@uoguelph.ca
- Email your instructor explaining the difficulty and how long it took to resolve the problem. We may extend the quiz by the amount of time it took to get the problem solved with CourseLink.

2. **For Short System Problems:**

- We may extend the deadline / access for the whole cla

1. **For Longer System Problem:**

- We may reschedule a make-up test / exam for another time
- If quizzes are missed because of **illness or other valid reasons**, you must contact the instructor as soon as possible, and the marks allotted for that quiz will be transferred to the final examination. Otherwise, a grade of zero will be assigned. There will be NO opportunity for make-up quizzes or additional assignments.
- See the section on Code of Conduct for the course below

6.4 Final Examination

Short answer questions, essay questions, and problems dealing with the entire semester's material. **The College of Biological Science policy stipulates that all students must write the final exam at this time.** Students who are unable to write the final exam at the scheduled time because of conflicts, or for other valid reasons, should contact their Academic Counsellor, and request a deferred final examination. Course instructors are prohibited from setting an alternate final examination at another time.

Due to the moving of all academic activity to alternate means due to COVID-19, the final exam will be administered online through CourseLink quizzes.

7 Course Statements

7.1 Recording of Classes

Recordings of classes are solely for the use of the authorized student, and may not be **reproduced, edited** in whole or part, or **transmitted** to others, without the express written consent of the instructor.

Since parts of classes are run synchronously on Zoom, students may be recorded during these sessions.

By enrolling in the course, unless explicitly stated and brought forward to their instructor, it is assumed that students agree to the possibility of being recorded during "live" (synchronous) course activities.

If a student prefers not to be distinguishable during a recording, they may:

1. turn off their camera
2. mute their microphone
3. edit their name (e.g., initials only) upon entry to each session
4. use the chat function to pose questions.

Students who express to their instructor that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with their instructor.

7.2 In Case of a Zoom Interruption

If our live-streaming class goes down during class, stay in the session and check your email within 10 minutes for instructions. If you do not hear from us in 10 minutes, the internet is

likely not working and the rest of class will be **cancelled**.

We will be in touch through email and an announcement about how we will make up the class.

7.3 Online Behaviour - Netiquette

There are things to do and things not to do:

Things to do. These are good things to do in a remote class:

- Show up early. You can use the time to test your tech, chat with people, etc.
- Set a good tone with comments. Tone is more difficult to read online, so making an extra effort helps communicate effectively
- Turn **ON** your video (optional but encouraged) to help us remember that we are real people in the class!
- Stay on **mute**, except when speaking. Feedback is a challenge when there's background noise.
- Raise your hand in Zoom when you want to say something or ask a question and wait until others have finished their thought. That way, everyone is heard.
- Say your name when you speak. This is especially helpful in bigger groups or if people are joining on the phone.
- You can use the chat function to ask questions. Participants can answer each other. Remember that the session is being recorded.
- The classes will be recorded and posted on CourseLink so that people can participate asynchronously.

Things NOT to do. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students
- Using obscene or offensive language online
- Copying or presenting someone else's work as your own
- Adapting information from the Internet without using proper citations or references
- Buying or selling term papers or assignments
- Posting or selling course materials to course notes websites
- Having someone else complete your quiz or completing a quiz for/with another student

- Stating false claims about lost quiz answers or other assignment submissions
- Threatening or harassing a student or instructor online
- Discriminating against fellow students, instructors and/or TAs
- Using the course website to promote profit-driven products or services
- Attempting to compromise the security or functionality of the learning management system
- Sharing your user name and password
- Recording lectures without the permission of the instructor

7.4 Time Zones

If you are joining us from another time zone, please ensure that you take into account the time change for class time, and when completing quizzes and final exam.

7.5 Honour Code of Conduct

In this remote course, you agree to abide by the following code of conduct:

1. I will not engage in any other activities that will dishonestly improve my results or dishonestly improve or hurt the results of others.
2. On quizzes:
 1. **my answers will be my own**
 2. **I will not communicate with anyone else**
 3. **I will not consult outside resources or look up answers**
 4. **I will not share responses or questions with anyone during or after the quiz.**

This includes any official answer keys provides by the course instructors or Teaching Assistants.

It's simple; it's straightforward: please behave **honourably, appropriately**, and with academic **integrity** (regardless of the course being held online).

By enrolling and participating in this course, you agree to follow the above honour code of conduct.

7.6 Academic Integrity

Academic misconduct limits learning and disadvantages honest students.

- For University policy on academic misconduct and penalties see: <https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08->

amisconduct.shtml

- For a better understanding of academic integrity see tutorials at: <https://academicintegrity.uoguelph.ca/> and <https://academicintegrity.uoguelph.ca/plagiarism>

7.7 Faculty Evaluation

As part of the faculty evaluation process, written comments on the teaching performance of the lecturer may be sent at any time to Dr. Marc Coppolino, Chair, Department of Molecular and Cellular Biology. Such letters must be signed; a copy is made available to the instructor after submission of final grades.

7.8 Viewing Final Examinations

The university regulations for viewing a final examination within the appropriate timeframe are listed in the Undergraduate Calendar: <https://www.uoguelph.ca/registrar/calendars/undergraduate/current/>

Permission must be requested from the Department Chair at mcbchair@uoguelph.ca.

8 Department of Molecular and Cellular Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides

support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.selfregulationskills.ca/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar. (<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
<https://www.uoguelph.ca/academics/calendars>

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

9.10 Illness

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.
