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
Monday, Wednesday, & Friday 9h30-10h20 in RICH 2529

1.4 Final Exam
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
Telephone: +1-519-824-4120 x53867
Office: SC1 2248
Office Hours: Jan 6 to Feb 11, 2020:

Mondays 2:30-3:30
Tuesdays 2:30-3:30

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, and reading list for the text-book are available at this site. The lecture notes will available before each lecture.
- Material will be posted as pdf files, which can be viewed and printed using Adobe Acrobat Reader.

Lehninger Principles of Biochemistry (Textbook)

- 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.

3.2 Additional Resources

An Introduction to Biological Membranes (Textbook)

- William Stillwell. AN INTRODUCTION TO BIOLOGICAL MEMBRANES: From Bilayers to
• 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

3.3 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.

3.3 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.
- new groups are formed and another paper and set of questions are answered
- 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 Review Sessions

A variety of review activities will be used:

1. review "game shows" with students as the contestants, such as Password, Pictionary, and Charades.
2. in-class Kahoot! competitions.
3. study questions pertaining to the material.
4. The review sessions that are scheduled before each quiz are an opportunity to discuss the topics to be examined in the class.
6 Assessments

6.1 Marking Schemes & Distributions

<table>
<thead>
<tr>
<th>Name</th>
<th>Scheme A (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Class Quiz 1</td>
<td>20</td>
</tr>
<tr>
<td>In-Class Quiz 2</td>
<td>20</td>
</tr>
<tr>
<td>In-Class Quiz 3</td>
<td>25</td>
</tr>
<tr>
<td>Final Examination (Cumulative)</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

6.2 Assessment Details

In-Class Quiz 1 (20%)
Date: Fri, Jan 24, in-class

Content from lectures 1-8

In-Class Quiz 2 (20%)
Date: Wed, Feb 26, in-class

Content from lectures 10-17

In-class Quiz 3 (25%)
Date: Fri, Mar 13, in-class

Content from lectures 19-26

Final Examination (Cumulative) (35%)
Date: TBA

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 lecture period, and will be of 45 minutes duration. 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.**

- *Weather issues on quiz days - If the university is open, quizzes will take place as scheduled,* and weather is not a valid excuse for failing to show up. If you are travelling to Guelph from another city, it is your responsibility to arrive on time. Snow is always forecast several days ahead of time, so you know it is coming; plan ahead and allow plenty of extra 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.

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.

7 Course Statements

7.1 Electronic Recording of Lectures

Electronic recording of lectures is expressly forbidden without prior consent of the instructor. When recordings are permitted, they are solely for the use of the authorized student, and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

7.2 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](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/](https://academicintegrity.uoguelph.ca/) and [https://academicintegrity.uoguelph.ca/plagiarism](https://academicintegrity.uoguelph.ca/plagiarism)

7.3 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.

7.4 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/

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-regregchg.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-
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