

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIOC 404		Number of Credits: 3 Course credit policy (105)																	
Course Full Title: Biomembranes																			
Course Short Title (if title exceeds 30 characters):																			
Faculty: Faculty of Science		Department (or program if no department): Chemistry																	
Calendar Description: Topics include the structure, dynamics, and function of membranes, membrane lipids, and proteins. Recent research in these areas will be examined.																			
Prerequisites (or NONE):		One of the following: BIO 320/BIOC 320 or BIOC 350/CHEM 350.																	
Corequisites (if applicable, or NONE):																			
Pre/corequisites (if applicable, or NONE):																			
Equivalent Courses (cannot be taken for additional credit) Former course code/number: Cross-listed with: Equivalent course(s): <i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>		Transfer Credit Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Transfer credit requested (OREg to submit to BCCAT): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form) Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No To find out how this course transfers, see bctransferguide.ca .																	
Total Hours: 45 Typical structure of instructional hours:		Special Topics Will the course be offered with different topics? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, different lettered courses may be taken for credit: <input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit <i>Note: The specific topic will be recorded when offered.</i>																	
<table border="1"> <tr><td>Lecture hours</td><td>33</td></tr> <tr><td>Seminars/tutorials/workshops</td><td>12</td></tr> <tr><td>Laboratory hours</td><td></td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td></td></tr> <tr><td>Other contact hours:</td><td></td></tr> <tr><td>Total</td><td>45</td></tr> </table>		Lecture hours	33	Seminars/tutorials/workshops	12	Laboratory hours		Field experience hours		Experiential (practicum, internship, etc.)		Online learning activities		Other contact hours:		Total	45	Maximum enrolment (for information only): 24 Expected frequency of course offerings (every semester, annually, every other year, etc.): every two years	
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Total	45																		
Department / Program Head or Director: David Fenske		Date approved: Sept 16, 2015																	
Faculty Council approval		Date approved: November 6, 2015																	
Campus-Wide Consultation (CWC)		Date of posting: February 12, 2016																	
Dean/Associate VP: Lucy Lee		Date approved: November 6, 2015																	
Undergraduate Education Committee (UEC) approval		Date of meeting: February 26, 2016																	

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Describe the structure and chemical properties of lipid bilayers and biological membranes
- Explain why lipids can self-assemble to form a variety of structural phases and the biological roles for these properties
- Explain how spectroscopic methods can be used to characterize lipid bilayers
- Describe the basic theory behind magnetic resonance and infrared spectroscopy methods
- Explain the roles of membrane proteins in cellular metabolism
- Relate the structure of membrane proteins and lipids to their biological functions
- Critically analyze recent membrane science research literature
- Analyze recent research literature

Prior Learning Assessment and Recognition (PLAR)

Yes No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Lecture course, student presentations

Grading system: Letter Grades: Credit/No Credit: Labs to be scheduled independent of lecture hours: Yes No

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)

Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1. Lehninger, A.L., et al	Principles of Biochemistry	<input checked="" type="checkbox"/>	USA	2012
2. .Luckey, M.	Membrane Structural Biology with Biochemical and Biophysical Foundations	<input checked="" type="checkbox"/>	UK	2008
3.		<input type="checkbox"/>		
4.		<input type="checkbox"/>		
5.		<input type="checkbox"/>		

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	10%	Midterm exam:	20%	Practicum:	%
Quizzes/tests:	10%	Lab work:	%	Field experience:	%	Shop work:	%
Project/Presentation:	20%	Other:	%	Other:	%	Total:	100%

Details (if necessary):

Typical Course Content and Topics

Membrane morphology
 Structure and Properties of Membrane Lipids
 Membrane Self-Assembly: the hydrophobic effect
 Liposomes
 Lipid polymorphism
 Lipid membranes: phase diagrams & cholesterol
 Characterization of membranes using physical techniques: diffraction, magnetic resonance (NMR/ESR), infrared spectroscopy
 Membrane asymmetry and lipid microdomains (RAFTS)
 Membrane potential
 Transport energetics
 Membrane Proteins: Ion Channels, Receptors, Transporters, and Proton Pumps
 Liposomes: biomedical applications
 Student Presentations