



## REVISED COURSE OUTLINE FOR REMOTE LEARNING

To account for the necessary transition to remote learning from March 13 onward, adjustments have been made to assessment deadlines and requirements so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff). If you are unable to meet the deadlines or requirements specified, please connect with your course instructor to work out alternative dates/assessments.

### 1. **Course:** BCEM 341, Biochemistry of Life Processes - Winter 2020

Lecture 01: MWF 13:00 - 13:50 - Remote Learning (check with your instructor or coordinator for details)

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Peter Tieleman	tieleman@ucalgary.ca	403 220-2966	BI 489	TBA
Dr. Brianne Burkinshaw	brianne.burkinsha1@ucalgary.ca	403 220-5350		By appointment on Zoom
Dr. Marie Fraser	frasm@ucalgary.ca	403 220-6145	BI 413	TBA

**Course Coordinator:** Dr. Marie Fraser

#### **Course Site:**

D2L: BCEM 341 L01-(Winter 2020)-Biochemistry of Life Processes

**Note:** Students must use their U of C account for all course correspondence.

**Please identify the course as BCEM 341 in the subject line of any e-mail messages.**

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### **Prerequisite(s):**

Chemistry 351.

#### **Antirequisite(s):**

Not open to majors in the Department of Biological Sciences or Natural Sciences concentrators in Biological Sciences. Credit for Biochemistry 341 and 393 will not be allowed.

### 3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Date
Midterm Exam I	15	Feb. 5, 2020
On-Line Midterm Exam II	15	Mar. 25, 2020
Laboratory Work (5 x 4% each)	20	
Quizzes (4 x 1% each)	4	
On-Line Final Exam	46	

A student may use the grade from the first midterm to replace grades from the second midterm and/or final exam. In these cases:

- 1) the weighting of Midterm Exam I is 76%, the weighting of Midterm Exam II is 0%, and the weighting of the Final Exam is 0%;
- 2) the weighting of Midterm Exam I is 30%, the weighting of Midterm Exam II is 0%, and the weighting of the Final Exam is 46%; or
- 3) the weighting of Midterm Exam I is 61%, the weighting of Midterm Exam II is 15%, and the weighting of the Final Exam is 0%.

Students must notify the course coordinator of their decision about the relative weighting of these exam components by downloading the form about exam weighting from D2L, and submitting the completed form via Dropbox before the final exam start time.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	92 %	86 %	82 %	78%	74%	70 %	66 %	62%	58%	54 %	50 %

#### 4. Missed Components Of Term Work:

The University has suspended requirements for students to provide evidence for reasons for absences so please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations. Please let your instructor know immediately if you are ill and cannot meet the deadlines specified.

#### 5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

**Midterm Exam II will be online on Wednesday, March 25, 2020. Students may begin writing Midterm Exam II at 1 pm MDT Wednesday, March 25, 2020. Midterm Exam II will be available for 24 hours to ensure sufficient time in case of technological issues; however, the exam is planned so that it can be completed within the original 50 min duration.**

**The Final Exam will be available online starting at 6:30 pm MDT on Monday April 20, 2020. The completed exam is due on D2L by 6:30 pm MDT on Tuesday April 21, 2020. The final exam will be available for 24 hours to ensure sufficient time in case of technological issues; however, the exam is planned so that it can be completed within the original 3-hour duration with time built in for any technological issues.**

#### 6. Course Materials:

Recommended Textbook(s):

John L. Tymoczko; Jeremy M. Berg; Lubert Stryer, *Biochemistry: A Short Course*: MacMillan.

The laboratory manual will be available from the D2L course site.

## 7. Examination Policy:

**Statement about the use of electronic devices or examination aids:** Midterm Exam I is a closed-book examination. Midterm Exam II and the Final Exam are open-book examinations. Calculators are allowed, but not programmable ones.

Students should also read the Calendar, [Section G](#), on Examinations.

## 8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

## 9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also [Section E.2](#) of the University Calendar.

## 10. Human & Living Organism Studies Statements:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

## 11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

## 12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).

- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).
- Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-6979. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.
- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- l. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies.

available at law.

### BCEM341 Winter 2020: Tentative Schedule

Jan.	13	Introduction to the Course and Lipids	DPT1
	15	Lipids in Membranes	DPT2
	17	Carbohydrates – Monosaccharides	DPT3
	20	Carbohydrates – Linking Monosaccharides	DPT4
	<b>20+21</b>	<b>Lab 1: Lipids (Quiz on Lipids)</b>	<b>MEF</b>
	22	Amino Acids – Structures and Properties	DPT5
	24	Peptides and Proteins - Peptide Bond and Primary Structure	DPT6
	27	<b>Report on lab 1 due at 1 pm via D2L</b> Peptides and Proteins - Secondary Structure	DPT7
	29	Peptides and Proteins - Tertiary and Quaternary Structure	DPT8
	31	Membranes, including Membrane Proteins; Transport across Membranes	DPT9
Feb.	3	Carbohydrates Attached to Proteins and Proteins that Bind Carbohydrates	BB1
	<b>3+4</b>	<b>Lab 2: Food Chemistry (Proteins and Carbs in Beer) (Quiz on Amino Acids)</b>	<b>MEF</b>
	<b>5</b>	<b>In Class: First Midterm - 9 lectures (Jan. 13 - Jan. 31) DPT1-DPT9, Chemical structure syllabus lipids and amino acids. Room(s) to be announced.</b>	<b>DPT</b>
	7	Basic Concepts about Enzymes	BB2
	10	<b>Report on lab 2 due at 1 pm via D2L</b> Enzyme Kinetics	BB3
	12	Enzyme Kinetics – Allosteric Enzymes	BB4
	14	Enzyme Mechanisms and Inhibitors	BB5
	15-21	Winter Break *** No Lectures***	
	24	Classes of Enzymes. Example of a Hydrolase: Chymotrypsin	BB6
	<b>24+25</b>	<b>Lab 3: Enzymatic Activity of b-Galactosidase (Quiz on Carbohydrates)</b>	<b>MEF</b>
	26	Example of an Allosteric Protein: Hemoglobin	BB7
	28	Digestion: Turning a Meal into Cellular Biochemicals	MEF1
Mar.	2	<b>Report on lab 3 due at 1 pm via D2L</b> Basic Concepts of Metabolism	MEF2
	4	Glycolysis	MEF3
	6	Fermentation and Regulation of Glycolysis	MEF4
	9	Gluconeogenesis	MEF5
	<b>9+10</b>	<b>Lab 4: A Metabolically Reversible Reaction (Quiz on Metabolically Important Molecules)</b>	<b>MEF</b>
	11	Preparation for Citric Acid Cycle & Citric Acid Cycle	MEF6+7
	13	Classes suspended	
	16	Classes suspended <b>Report on lab 4 due at 1 pm March 17 via D2L</b>	
	18	Oxidative Phosphorylation	MEF8+9
	20	Nucleic Acids: Base Pairing, the Double Helix and DNA Packaging	DPT10
	23	DNA Replication	DPT11
	<b>23+24</b>	<b>Lab 5: Plasmid Purification</b> <b>Pre-lab assignment due at 5:30 pm Mar. 24 via D2L</b>	<b>MEF</b>
	<b>25</b>	<b>In Class: Second Midterm - 15 lectures (Feb. 3 - Mar. 18) BB1-7, MEF1-9, Chemical structure syllabus lipids, amino acids, carbohydrates and metabolically important molecules, Labs 3 and 4. Administered via D2L.</b>	<b>MEF, BB</b>
	27	DNA Repair and Recombination	DPT12
	30	Transcription of DNA = Synthesis of RNA	DPT13
Apr.	1	Gene Expression and RNA Processing in Eukaryotes	DPT14
	3	The Genetic Code and tRNA	DPT15
	6	Translation of RNA	DPT16
	<b>6+7</b>	<b>Lab 6: DNA Cleavage and Electrophoresis</b> <b>Pre-lab assignment due at 5:30 pm Apr. 7 via D2L</b>	<b>MEF</b>
	8	Review	DPT/MEF/BB
	10, 13	<b>Easter Weekend *** No Lectures***</b>	
	14	<b>Report on labs 5 and 6 due at 1 pm via D2L</b>	
	15	No Lecture	

**Final Exam Scheduled by the Registrar, Administered via D2L.**

**Course Outcomes:**

- By the end of this course, successful students will be able to:

- 1. Compare the structures of the major classes of biological molecules, i.e. lipids, carbohydrates, proteins and nucleic acids, and relate these to their cellular roles;
- 2. Describe and experimentally examine how enzymes catalyze reactions, and describe how pH, temperature, inhibitors and allosteric regulators can affect the functions of enzymes using the principles of protein structure, Michaelis-Menten kinetics, and allostery;
- 3. Distinguish between aerobic and anaerobic carbohydrate metabolism, and describe for each reaction the flow of energy and matter, the purpose(s), the mechanism of catalysis and regulations, and the conditions under which the reaction occurs;
- 4. Explain the process of DNA replication, RNA transcription and translation of RNA into proteins that can be post-translationally modified, and how errors in DNA can give rise to mutations that are either lethal or non-lethal;
- 5. Demonstrate skills frequently used in biochemistry laboratories: dispense small volumes accurately using mechanical pipettors; perform serial dilutions; measure absorbance by visible spectroscopy; use standard curves for quantification; use chromatography and electrophoresis to separate biochemical molecules; distinguish qualitative from quantitative experiments; work as a team; communicate biochemical experiments in written reports.

Electronically Approved - Mar 20 2020 17:51

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**Department Approval**

Electronically Approved - Mar 22 2020 19:34

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**Associate Dean's Approval for alternate final examination arrangements or remote learning**