



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF BIOLOGICAL SCIENCES  
**COURSE OUTLINE**

**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: BIOCHEMISTRY 403 – BIOCHEMISTRY LABORATORY TECHNIQUES II**

Lecture Sections: **L01** TR 09:30 **BI 587** Winter 2020

Remote Learning (check with your instructor or coordinator for details)

<b>Instructor(s):</b>	<b>Dr. G. Moorhead</b>	<b>BI 144A</b>	<b>220-6238</b>	<a href="mailto:moorhead@ucalgary.ca">moorhead@ucalgary.ca</a>
	<b>Dr. E. Prenner</b>	<b>BI 145A</b>	<b>220-7632</b>	<a href="mailto:eprenner@ucalgary.ca">eprenner@ucalgary.ca</a>

D2L course website: **BCEM403 W2020**

Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

**2.PREREQUISITES:** Chemistry 311 and Biochemistry 401 and 471

See section 3.5.C in the Faculty of Science section of the online

Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

**ANTIREQUISITE:** Credit for both Biochemistry 403 and 541 will not be allowed. BCEM 541 does not exist.

**3. GRADING:** The University policy on grading and related matters is described in “Academic Regulations, sections F.1 and F.2 of the online University Calendar:

(<http://www.ucalgary.ca/pubs/calendar/current/f-1.html> and <http://www.ucalgary.ca/pubs/calendar/current/f-2.html>)

In determining the overall grade in the course the following weights will be used:

Midterm Exam (first half of the course)	35%
<b>Final Exam (last half of the course)</b>	<b>35% optional</b> Open Book On-Line
Labs 1-5, 8 and 10; 1% each (short reports)	7%
Labs 1-5 combined as a protein purification paper	5%
Labs 6, 7 and 9;	5% each (full reports)=15%
Lab book, Practical Assessment	3%

We will allow students the option of NOT writing a final exam and they will get a grade based on the other course components. Some students may choose to write the final exam based on the

last half of the course in order to improve their grade. **The final exam will be open book and in essay format to answer questions or analyze information.** The exam will be posted on D2L and available for 24 hrs beginning April 28, 2020 at 3:30 PM. Answers will be posted to D2L by 3:30 pm April 29, 2020.

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	94	86	82	78	74	70	66	62	58	54	50

Except Labs: F = Below 58

**A mark of  $\geq 58\%$  is the minimal passing grade for the lab component of this course.**

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student’s average percentage score for the various components 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, bearing in mind that a failing grade will result if the student does not pass the combined lab component which consists of all components except the exams.

**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. Dates and times of class exercises held outside of class hours:

**Midterm 1: Thursday, February 27 8:45-10-45 In class (start 43 min early\*)**

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

**Department Approval** \_\_\_\_\_ **Date** \_\_\_\_\_

**Associate Dean’s Approval for out of regular class-time activity:**

\_\_\_\_\_ **Date:** \_\_\_\_\_

C403 W14; 26/09/2013 14:04

**6. EXAMINATION POLICY:** No electronic or written aids (eg. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>

**7. 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 the 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 fieldwork requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conform 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 concerns 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 15 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections I.1 and I.2 of the University Calendar.
- b. **Final Exams:** 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 resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 30, 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.

- 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.
- 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 was 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 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 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 (FOIPPA). 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. VP Academic, Phone: 403-220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: 403-220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- i. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: 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.

1. 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.

**BCEM 403 Winter 2020: Lecture Schedule (Revised March 2020)**

<b>Date</b>	<b>Topic</b>	<b>Instructor</b>	
Jan.	14	Introduction to the course/ why proteins/ purification overview	GM
	15/16	<b>Lab 1: <math>\beta</math>-galactosidase assays and background search</b>	GM
	16	Enzyme assays/ cell biology	GM
	21	Generic strategy/ sample sources (recombinant and model)	GM
	22/23	<b>Lab 2: Ammonium sulfate precipitation of <math>\beta</math>-galactosidase</b>	GM
	23	Purification goals/ protein properties/ sample preparation/ precipitation	GM
	28	Organelles/ differential centrifugation/ sample handling	GM
	29/30	<b>Lab 3: Ion exchange chromatography of <math>\beta</math>-galactosidase</b>	GM
	30	Chromatography principles/ Ion exchange chromatography	GM
Feb	4	Ion exchange chromatography /Case study #1	GM
	5/6	<b>Lab 4: Gel filtration chromatography of <math>\beta</math>-galactosidase</b>	GM
	6	Size exclusion/ gel filtration chromatography / Case study #2	GM
	11	Hydrophobic interaction chromatography (HIC)/ Case study #3	GM
	12/13	<b>Lab 5: SDS PAGE of <math>\beta</math>-galactosidase</b>	GM
	13	SDS-PAGE vs native/ Protein storage/ Case study #4	GM
	18	<b>READING WEEK NO CLASSES</b>	GM
	19/20	<b>No lab this week</b>	GM
	20	<b>READING WEEK NO CLASSES</b>	GM
	25	Case study #5 /Review	GM
	26/27	<b>No lab week of midterm</b>	GM
	27	<b>MIDTERM - in class - 2 hours, starting at 8:45 am.</b>	GM
Mar	3	Antibodies as a tool in biochemistry	GM
	4/5	<b>Lab 6: Western blotting/ Native PAGE</b>	GM
	5	Antibodies as a tool in biochemistry	GM
	10	Affinity chromatography	GM
	11/12	<b>Lab 7: His-tag chromatography</b>	GM
	12	Affinity chromatography	GM
	17	Modern use of affinity chromatography: The target landscape of clinical kinase drugs	GM
	18/19	<b>No lab this week.</b>	GM
	19	CD spectroscopy lecture	EP
	24	CD: work on review and send ppt by Mar31 (online groups of 2 possible)	EP
	25/26	<b>Lab 8: CD spectroscopy of proteins cancelled</b>	EP
	26	Fluorescence spectroscopy	EP
	31	Fluorescence spectroscopy Info file posted work on Practice problems	EP
April	1/2	<b>Lab 9: Fluorescence spectroscopy analysis data and report by Apr 8/9</b>	EP
	2	Submit answers to practice problems (online groups of 2 possible)	EP
	7	Introduction to SPR, DSC and ITC info posted	EP
	8/9	<b>Lab 10: Demo for SPR, DSC and IT: short lab report by Apr 13/14</b>	EP
	9	<b>Mass spectrometry/proteomics cancelled</b>	Guest

	14	Synopsis and Review	EP/GM
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