



COURSE OUTLINE

1. **Course:** BCEM 403, Biochemistry Laboratory Techniques II - Winter 2019

Lecture 01: TR 09:30 - 10:45 in BI 587

Instructor	Email	Phone	Office	Hours
Elmar Prenner	eprenner@ucalgary.ca	220-7632	BI 145	TBA
Gregory Moorhead	moorhead@ucalgary.ca	403 220-6238	BI 144	TBA

Course Site:

D2L: BCEM 403 L01-(Winter 2019)-Biochemistry Laboratory Techniques II

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

2. **Requisites:**

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

Prerequisite(s):

Biochemistry 401 and 471.

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 (first half of the course) In-Class 8:45-10:45 AM	30%	Feb 28 2019
Final exam (last half of the course)	30%	
Labs 1-5, 8 and 10; short reports 1% each	7%	
Labs 1-5 combined as a protein purification paper	7%	
Labs 6,7 and 9; 7% each (full reports)	21%	
Lab book, practical assessment	5%	

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

A failing grade will result if the student does not pass the combined lab component which consists of all components except the exams.

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
Minimum % Required	92 %	86 %	82 %	78%	74%	70 %	66 %	62%	58%	54 %	50 %

This course has a registrar scheduled final exam.

4. Missed Components Of Term Work:

In the event that a student misses the midterm or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration will be required (see [Section N.1](#); for more information regarding the use of statutory declaration/medical notes, see [FAQ](#)). Absences must be reported within 48 hrs.

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize themselves with these regulations. See also [Section E.3](#) of the University Calendar.

5. Scheduled Out-of-Class Activities:

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm Exam	TBA	Thursday, February 28, 2019 at 8:45 am	2 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. Course Materials:

There are no additional course materials required for this course.

7. Examination Policy:

No aids are allowed on tests or examinations.

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 **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 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 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) 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 or phone [403 220-6979](tel: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.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](#) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](#) Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: suvpaca@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.

BCEM403 Winter 2019: Lecture Schedule

Date Topic Instructor

Jan.	10	Introduction to the course/ why proteins/ purification overview	GM
	15	Enzyme assays/ cell biology	GM
	16/17	Lab 1: b-galactosidase assays and background search	GM
	17	Generic strategy/ sample sources (recombinant and model)	GM
	22	Purification goals/ protein properties/ sample preparation/ precipitation	GM
	23/24	Lab 2: Ammonium sulfate precipitation of b-galactosidase	GM
	24	Organelles/ differential centrifugation/ sample handling	GM
	29	Chromatography principles/ Ion exchange chromatography	GM
	30/31	Lab 3: Ion exchange chromatography of b-galactosidase	GM
	31	Ion exchange chromatography /Case study #1/	GM
Feb	5	Size exclusion/ gel filtration chromatography / Case study #2	GM
	6/7	Lab 4: Gel filtration chromatography of b-galactosidase	GM
	7	Hydrophobic interaction chromatography (HIC)/ Case study #3	GM
	12	SDS-PAGE vs native/ Antibodies as a tool in biochemistry	GM
	13/14	Lab 5: SDS PAGE of b-galactosidase	GM
	14	Antibodies as a tool in biochemistry	GM
	19	READING WEEK NO CLASSES	GM
	19/20	No lab this week	
	21	READING WEEK NO CLASSES	GM
	26	Protein storage/ Review	GM
	27/28	No lab week of midterm	GM
	28	MIDTERM - in class - 2 hours, <u>starting at 8:45 am.</u>	
Mar	5	Affinity chromatography	GM
	6/7	Lab 6: Western blotting/ Native PAGE	GM
	7	Affinity chromatography	GM

	12	Affinity chromatography /Case study #3	GM
	13/14	Lab 7: His-tag chromatography	GM
	14	Modern use of affinity chromatography: The target landscape of clinical kinase drugs	GM
	19	The target landscape of clinical kinase drugs	GM
	20/21	No lab this week.	
	21	CD spectroscopy	EP
	26	CD spectroscopy lab preparation	EP
	27/28	Lab 8: CD spectroscopy of proteins	EP
	28	Fluorescence spectroscopy	EP
April	2	Fluorescence spectroscopy lab preparation	EP
	3/4	Lab 9: Fluorescence spectroscopy	EP
	4	Analysis of CD/Fluorescence data	EP
	9	Introduction to SPR, DSC and ITC	EP
	10/11	Lab 10: Demo for SPR, DSC and ITC	EP
	11	Synopsis and Review	EP/GM

Final Exam: A two hour exam will be scheduled by the registrar.

Course Outcomes:

- Search for background references and extract bioinformatic information pertaining to a protein that will be purified in the first part of the course
- Purify the protein of interest to homogeneity using classical methods of purification, detection, and quantification
- Write a paper using formatting as specified by a journal selected by the instructor
- Describe the importance of protein: protein interactions in biochemistry and apply various biochemical approaches (for example, using antibodies) to detecting these interactions
- Know how to apply various affinity chromatography methods to purify recombinant proteins expressed with special affinity tags
- Analyze the kinetic parameters and inhibition of an enzyme
- Implement spectroscopic techniques and biophysical techniques to characterize proteins and to monitor the binding of ligands to proteins
- Design and implement experiments to answer questions about the structure and function of enzymes and proteins
- Interpret and communicate the results of biochemical experiments in written reports with clarity and conciseness

Department Approval:

Electronically Approved

Date: 2019-01-09 13:08

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

Electronically Approved

Date: 2019-01-09 17:03