



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

1. **Course:** BCEM 401, Biochemistry Laboratory Techniques I -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
<i>L01:</i> (TR 09:30 - 10:45 in SB 148)				
Marie Fraser	frasm@ucalgary.ca	403-220-6145	BI 413	Monday 2-3 pm
Steven Zimmerly	zimmerly@ucalgary.ca	403-220-7933	Biological Sciences 319C	Send an email to set up an appointment
Vanina Zaremberg	vzaremb@ucalgary.ca	(403) 220-4298	BI390	arrange via e-mail

Course Site:

D2L: BCEM 401 L01-(Fall 2018)-Biochemistry Lab Techniques I

Department of Biological Sciences:

Office: BIO 186
Phone: 403 220-3140
Email: biosci@ucalgary.ca

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 393 and one of Chemistry 353 or 355.

Antirequisite(s): Credit for Biochemistry 401 and Cellular, Molecular and Microbial Biology 451 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 %
Midterm Exam	25%
Final Exam	25%
Long Lab Reports	6%
Cloning assignment	8%
Medium Lab Reports (6 x 4%)	24%
Short Lab Reports (2 x 2%)	4%
Practical Assessment	4%
Lab Book	4%

A mark of greater than or equal to 58% is required on the laboratory portion of this course (all components except the exams) to pass the course as a whole.

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	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	53 %	50 %

This course has a registrar scheduled final exam.

4. **Missed Components of Term Work:**

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 himself/herself/themself with these regulations. See also [Section E.3](#) of the University Calendar.

5. **Scheduled out-of-class activities:**

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

6. **Course Materials:**

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.

1. **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

2. **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](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 (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](tel:403-220-3911) Email: suypaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: suypaca@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.

BCEM 401 - Biochemistry Laboratory Techniques I- F2018
TENTATIVE SCHEDULE (Due dates for the reports are in red)
Lecture room SB148 9:30-10:45am
Laboratory room: BI 117

Week	Month	Day		Description of Lectures and Labs
1	Sept	6	VZ-SZ- 1	Introduction to the Course /Nucleotide structures, DNA and RNA structures
2	Sept	11	SZ- 2	Enzymes and enzymatic manipulation of DNA and RNA
2	Sept	12, 13	VZ - Lab 1	Library session -Reference management*; LAB: Safety Basic Techniques Report is 2%" Sept 19 & 20
2	Sept	13	SZ- 3	Plasmid structure, purification of nucleic acids, separation of DNA
3	Sept	18	SZ - 4	Central dogma, prokaryotic/eukaryotic gene structures
3	Sept	19,20	SZ -Lab 1	LAB: Nucleic Acids *Bioinformatics Lab
3	Sept	20	SZ - 5	Report is 4 %" Sept 26 & 27 PCR, colony PCR, primer design
4	Sept	25	VZ - 1	Cloning I: Restriction Enzymes
4	Sept	26, 27	VZ - Lab 2	LAB: Recombinant DNA Techniques-1
4	Sept	27	VZ -2	Report is 4%" Oct 3 & 4 Cloning II: Cloning Vectors
5	Oct	2	VZ -3	Cloning III: transformations and screening recombinants
5	Oct	3, 4	VZ - Lab 3	LAB: Recombinant DNA Techniques-2
5	Oct	4	VZ -4	Report is 2%" Oct 10 & 11 Cloning IV: Sources of DNA for cloning
6	Oct	9	VZ -5	Expression vectors
6	Oct	10, 11	VZ - Lab 4	LAB: Recombinant DNA Techniques-3- Work on cloning assignments
6	Oct	11	VZ -6	Cloning Assignment is 8% "Oct 17 & 18 Other cloning strategies-
7	Oct	16	VZ -7	Sequencing- lecture and facilities tour in Health Science Building-room TBA
7	Oct	17, 18	VZ - Lab 5	LAB: Recombinant DNA Techniques-4 Report is 4%" Oct 24 & 25
7	Oct	18	VZ -8	Mutagenesis
8	Oct	23	MF-1	Proteins- properties
8	Oct	24, 25	VZ - Lab 6	LAB: Recombinant DNA Techniques-5 Report is 6%" Nov 1 & 2
8	Oct	25	MF-2	Preparation for Protein Bioinformatics Lab
9	Oct	30	MF -3	Preparation for Protein Bioinformatics Lab (cont'd)
9	Oct- Nov	31, 1	MF-Lab 1	LAB: Protein Bioinformatics Lab Report is 4%" Nov 20
9	Nov	1	MF -4	Refolding of proteins from inclusion bodies
10	Nov	6	VZ-SZ	Review
10	Nov	7, 8		
10	Nov	8	VZ-SZ	midterm in class (8:00-10:45 am) room-TBA
11	Nov	11-17		Fall break-no classes
12	Nov	20	MF-5	Preparation for protein absorbance and concentration lab
12	Nov	21, 22	MF- Lab 2	LAB: Protein Absorbance and Concentration Report is 4%" Nov 28 & 29
12	Nov	22	MF-6	Preparation for Working with Proteins lab
13	Nov	27	SZ-6	Real-time PCR, hybridization and blots
13	Nov	28, 29	MF- Lab 3	LAB: Working with Proteins. Report is 4%" Dec 6 & 7
13	Nov	29	SZ-7	Hybridizations and blots (continued)

14	Dec	4	SZ - 8	Next generation sequencing technologies
14	Dec	5, 6		DATA analysis and writing final report
14	Dec	6	SZ - 9	Overflow-review
Exam period	Dec	TBA	SZ & MF	FINAL exam scheduled by the Registrar (3 hours)

***LIBRARY SESSION**

Wednesday, September 12, 1-2 pm
Classroom **TFDL440B**

Thursday, September 13, 11-noon
Classroom **TFDL440B**

Computer Labs:

Bioinfo-DNA

Sept 19 13:00-18:50 (computer room TBA)

Sept 20 11:00-16:50 (computer room TBA)

Bioinfo-Proteins

Oct 31 13:00-18:50 (computer room TBA)

Nov 1 11:00-16:50 (computer room TBA)

Department Approval:

Electronically Approved

Date: 2018-09-04 14:22

Course Outcomes

- Describe the structure and the chemical properties of nucleic acids (RNA and DNA)
- Explain and apply methods used in the purification, quantification and analysis of nucleic acids
- Master and troubleshoot basic molecular biology techniques for cloning and expression of recombinant proteins in E coli
- Analyze sequences of nucleic acids and proteins using bioinformatic resources in order to predict the structure and function of these macromolecules
- Prepare reagents for experiments using good quantitative skills
- Implement biochemical and biophysical techniques to purify, characterize and manipulate biomolecules, particularly proteins and nucleic acids
- Operate in an effective team as demonstrated by the ability to give and take instructions
- Work safely alone and in an effective team as demonstrated by the ability to recognize unsafe situations and to access and interpret safety data
- Communicate their biochemical experiments in written reports with clarity and conciseness
- Manage time effectively to meet deadlines for course requirements