



# UNIVERSITY OF CALGARY

## DEPARTMENT OF BIOLOGICAL SCIENCES COURSE OUTLINE

### 1. **Course:** BIOCHEMISTRY 401 – Biochemistry Laboratory Techniques I

LECTURE:	L01:	TR	9:30-10:45	EDC 278	FALL 2015
Instructor(s):	Dr. V. Zaremborg		220-4298	BI 390	vzaremb@ucalgary.ca
	Dr. M.E. Fraser		220-6145	BI 413	frasm@ucalgary.ca
	Dr. S. Zimmerly		220-7933	BI 319C	zimmerly@ucalgary.ca

Desire 2 Learn (D2L) course name: BCEM 401 L01 - (Fall 2015) - Biochemistry Lab Techniques I

Biological Sciences Department BI 186 220-3140 [biosci@ucalgary.ca](mailto:biosci@ucalgary.ca)

### 2. **Prerequisites:** One of Chemistry 353 or 355; and Biochemistry 393 See section 3.5.C in the Faculty of Science section of the online Calendar ([www.ucalgary.ca/pubs/calendar/current/sc-3-5.html](http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html))

**Antirequisites:** Credit for both Biochemistry 401 and either 541 or CMMB 451 will not be allowed.

### 3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Midterm Exam	25%
Final Exam	25%
Long Lab Reports & Assignment (2x6%)	12%
Medium Lab Reports (6x4%)	24%
Short Lab Reports (3x2%)	6%
Practical Assessment	4%
Lab Book	4%

**A mark of  $\geq 58\%$  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 (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 an F grade will result if the student does not pass the laboratory component).

### 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 with these regulations. See also [Section E.6](#) of the University Calendar

### 5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours.

MIDTERM EXAM- NOV. 10 9:00 – 11:30A.M. TBA

**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.

### 6. **Course Materials:** All materials including lecture notes and lab manuals will be available in D2L

### 7. **Examination Policy:** The use of wireless access devices such as cell phones, PDAs (Palm OS or Pocket PC devices, etc.) during the examination will not be allowed. Students should also read the Calendar, [Section G](#), on Examinations.

8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

#### ETHICS IN THE BIOLOGICAL SCIENCES

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.

#### 9. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **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
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Student Accommodations:** 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 [http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf).
- Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-3140.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). As one consequence, 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 also
- (f) <http://www.ucalgary.ca/secretariat/privacy>
- (g) **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: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca); <http://ucalgary.ca/provost/students/ombuds>
- (h) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (i) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

Department Approval \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date: \_\_\_\_\_

**TERM: Fall 2015**

PREREQUISITE(S): One of Chemistry 353 or 355; and Biochemistry 393

Antirequisite(s): Credit for both Biochemistry 401 and either BCEM 541 or CMMB 451 will not be allowed.

Students may not register in a course unless they have a grade of at least C- in each prerequisite course.

COURSE COORDINATOR: Dr. V. Zarembeg BI 390 220-4298 vzarembeg@ucalgary.ca

LECTURERS: Dr. M.E. Fraser BI 413 220-6145 frasm@ucalgary.ca  
Dr. S. Zimmerly BI 319C 220-7933 zimmerly@ucalgary.ca  
Dr. V. Zarembeg

LECTURES: TR 09:30 EDC 278

LABS: B01 Wed 1300-1850 BI 117  
B02 Thurs 1100-1650 BI 117

TEXT: None

MARK DISTRIBUTION: A. Composition of Final Grade

Midterm Exam	25%
Final Exam	25%
Long Lab Reports & Assignment (2x6%)	12%
Medium Lab Reports (6x4%)	24%
Short Lab Reports (3x2%)	6%
Practical Assessment	4%
Lab Book	4%

B. Final Exam

There will be a final examination scheduled by the Registrar's Office.

C. Components of course for which a passing grade is essential

Lab Assessment. A mark of  $\geq 58\%$  is required on the laboratory portion of this course (all components except the exams) to pass the course as a whole

D. Grade Scale

Lab Grade Scale

86% $\Rightarrow$ A	
82 $\Rightarrow$ A-	$\geq 58\% \Rightarrow$ pass
78 $\Rightarrow$ B+	
74 $\Rightarrow$ B	
70 $\Rightarrow$ B-	
66 $\Rightarrow$ C+	
62 $\Rightarrow$ C	
58 $\Rightarrow$ C-	
54 $\Rightarrow$ D+	
50 $\Rightarrow$ D	
$< 50\% \Rightarrow$ F	

**BCEM 401 F2015 – Biochemistry Laboratory Techniques I**  
**TENTATIVE SCHEDULE (Due dates for the reports are in red)**

Week	Month	Day		Description of Lectures and Labs
1	Sept	8	VZ MF-1	Introduction to the Course and first lab
1	Sept	9, 10	MF –Lab 1	Library -End-Note*, LAB: Safety and Basic Techniques <b>Report is 2% → Sept 16 &amp; 17</b>
1	Sept	10	SZ - 1	Nucleotide structures, DNA and RNA structures
2	Sept	15	SZ - 2	Enzymes and enzymatic manipulation of DNA and RNA
2	Sept	16,17	SZ –dry lab	LAB: Nucleic Acids *Bioinformatics Lab <b>Report is 4 %→ Sept 23 &amp; 24</b>
2	Sept	17	SZ – 3	Plasmid structure, purification of nucleic acids, separation of DNA
3	Sept	22	SZ – 4	Central dogma, prokaryotic/eukaryotic gene structures
3	Sept	23, 24	VZ – Lab 1	LAB: Basic Techniques for Rec DNA Manipulation <b>Report is 2%→ Sept 30 &amp; Oct 1</b>
3	Sept	24	SZ – 5	PCR, colony PCR, primer design
4	Sept	29	VZ-1	Cloning I: Restriction Enzymes
4	Sept-Oct	30, 1	VZ – Lab 2	LAB: Recombinant DNA Techniques-1 <b>Report is 4%→ Oct 7 &amp; 8</b>
4	Oct	1	VZ-2	Cloning II: Cloning Vectors
5	Oct	6	VZ-3	Cloning III: transformations and screening recombinants
5	Oct	7, 8	VZ – Lab 3	LAB: Recombinant DNA Techniques-2 <b>Report is 2%→ Oct 14 &amp; 15</b>
5	Oct	8	VZ-4	Cloning IV: Sources of DNA for cloning
6	Oct	13	VZ-5	Expression vectors
6	Oct	14, 15	VZ – Lab 4	LAB: Recombinant DNA Techniques-3 <b>Cloning Assignment is 6% →Oct 21 &amp; 22</b>
6	Oct	15	VZ-6	Sequencing
7	Oct	20	VZ-7	Other cloning strategies
7	Oct	21, 22	VZ – Lab 5	LAB: Recombinant DNA Techniques-4 <b>Report is 4%→ Oct 28 &amp; 29</b>
7	Oct	22	VZ-8	Mutagenesis
8	Oct	27	MF-2	Proteins - properties and functions
8	Oct	28, 29	VZ – Lab 6	LAB: Recombinant DNA Techniques-5 <b>Report is 6%→ Nov 4 &amp; 5</b>
8	Oct	29	MF-3	Protein bioinformatics
9	Nov	3	MF-4	Protein refolding
9	Nov	4, 5	MF-dry lab (2)	LAB: Protein *Bioinformatics Lab <b>Report is 4%→ Nov 18 &amp; 19 -</b>
9	Nov	5	VZ-SZ	Review
<b>10</b>	<b>Nov</b>	<b>10</b>	<b>VZ-SZ</b>	<b>midterm in class (9-11:30am) room-TBA</b>
10	Nov	11, 12		***** Reading week – no lab *
10	Nov	12		***** Reading week – no lecture *****
11	Nov	17	MF-5	Protein absorbance and concentration
11	Nov	18, 19	MF- Lab 3	LAB: Protein Absorbance and Concentration <b>Report is 4%→ Nov 25 &amp; 26</b>
11	Nov	19	MF-6	Protein function: enzymatic activity
12	Nov	24	SZ – 6	Real-time PCR, hybridization and blots
12	Nov	25, 26	MF – Lab 4	LAB: Working with Proteins. <b>Report is 4%→ Dec 2 &amp; 3</b>
12	Nov	26	SZ – 7	Hybridizations and blots (continued)
13	Dec	1	SZ – 8	Next-generation sequencing technologies I
13	Dec	2,3		LAB: Data analysis & Writing the final lab report.
13	Dec	3	SZ - 9	Next-generation sequencing technologies II
13	Dec	8	SZ – MF	Overflow and Review
Exam period	Dec	TBA	SZ & MF	FINAL exam scheduled by the Registrar (3 hours)

**\*LIBRARY SESSION TFDL 440A, Wednesday, September 9, 1-3 pm & Thursday, September 10, 11-1 pm**