

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: **BIOCHEMISTRY 403 – BIOCHEMISTRY LABORATORY TECHNIQUES II**

Lecture Sections: **L01** TR 09:30 **BI 587** Winter 2016

Instructor(s): **Dr. E. Lohmeier-Vogel** **BI 039** **220-8281** lohmeier@ucalgary.ca
 Dr. G. Moorhead **BI 144A** **220-6238** moorhead@ucalgary.ca
 Dr. R. Edwards **BI 443** **220-5350** redwards@ucalgary.ca

D2L course website: BCEM403 W2016
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.

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)	22%
Final exam (last half of the course)	23%
Labs 1-5 short reports 2% each	10%
Labs 1-5 combined as a protein purification paper	15%
Labs 6-10 5% each (full reports)	25%
Lab book, practical assessment	5%

A mark of \geq 58% is the minimal passing grade for the lab component of this course.
There will be a final exam scheduled by the Registrar's office.

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 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: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.
5. Dates and times of class exercises held outside of class hours: None

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.

Midterm 1 Thursday, February 25 8:45-10:45 In class

Department Approval _____ **ORIGINAL SIGNED** _____ Date _____

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. In this course, the quality of the student's writing in laboratory reports and on exam answers will be a factor in the evaluation of those reports. See also <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>.
8. **STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students are expected to be familiar with <http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html> of the on-line calendar. See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>.
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 K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) 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 at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.**
 - (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.

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 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 (FOIPP). 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 <http://www.ucalgary.ca/secretariat/privacy>.
 - (f) **STUDENT UNION INFORMATION:** VP Academic **Phone:** 220-3911 **Email:** suvpaca@ucalgary.ca. SU Faculty Rep. **Phone:** 220-3913 **Email:** sciencerep@su.ucalgary.ca Website <http://www.su.ucalgary.ca/home/contact.html>. Student Ombudsman: www.ucalgary.ca/provost/students/ombuds; ombuds@ucalgary.ca 220-6420
 - (g) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information.** You can assume that in all classes that you attend, **your cell phone should be turned off.** 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.
 - (h) 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). Your responses make a difference - please participate in USRI Surveys.

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DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

BIOCHEMISTRY 403
BIOCHEMISTRY LABORATORY TECHNIQUES II

TERM:	Winter 2016	SECTION NO: L01
PREREQUISITE(S):	Chemistry 311, BCEM 401 and 471	
ANTIREQUISITE(S):	Credit for both Biochemistry 403 and 541 will not be allowed.	
Note:	Students may not register in a course unless they have a grade of at least C- in each prerequisite course.	
COURSE COORDINATOR:	Dr. Lohmeier-Vogel	BI 039 220-8281 lohmeier@ucalgary.ca
LECTURERS:	Dr. Lohmeier-Vogel	BI 039 220-8281 lohmeier@ucalgary.ca
	Dr. G. Moorhead	BI 144A 220-6238 moorhead@ucalgary.ca
	Dr. R. Edwards	BI 443 220-5350 redwards@ucalgary.ca
LECTURES:	T+R	09:30 – 10:45 BI 587
LABS:	W	13:00 – 18:50 BI 117
	R	11:00 – 16:50 BI 117
	F	13:00 – 18:50 BI 117 (Tentative)
TEXT:	Biochemistry Laboratory, Modern Theory and Techniques by Rodney Boyer (suggested)	

MARK DISTRIBUTION A. Composition of marks

Midterm Exam (first half of the course)	22%
Final Exam (last half of the course)	23%
Labs 1-5 2 % each (methods + results only)	10%
Labs 1-5 combined as a protein purification paper	15%
Labs 6-10 5% each (full reports)	25%
Lab book, Practical Assessment	5%

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

D. Grading Scale:
A : above 86%; A- : 82%; B+ : 78-; B : 74; B- : 70%;
C+ : 66%; C : 62%; C- : 58%; D+ : 54%; D : 50%; F : below 50%;

Except Labs: F = Below 58%

BCEM403 Winter 2016: Tentative Lecture Schedule

Date	Topic	Instructor	
Jan.	12	Introduction to the course/ introduction to protein purification	ELV
	13/14	Lab 1: β-galactosidase assays and background search	ELV
	14	The β -galactosidase assay, preparation for lab 1	ELV
	19	Cell breakage methods	ELV
	20/21	Lab 2: Ammonium sulfate precipitation of β-galactosidase	ELV
	21	Protein precipitation methods	ELV
	26	Ion exchange chromatography	ELV
	27/28	Lab 3: Ion exchange chromatography of β-galactosidase	ELV
	28	Ion exchange chromatography/Gel filtration chromatography	ELV
Feb	2	Gel filtration applications	ELV
	3/4	Lab 4: Gel filtration chromatography of β-galactosidase	ELV
	4	Protein assays	ELV
	9	Purification table/SDS PAGE	ELV
	10/11	Lab 5: SDS PAGE of β-galactosidase	ELV
	11	SDS PAGE	ELV
	15-19	READING WEEK NO CLASSES	
	23	Hydrophobic interaction chromatography (example), dye chromatography	ELV
	24/25	No lab this week	
	25	MIDTERM - in class - 2 hours, starting at 8:45 am. Protein paper due!	ELV
Mar	1	Western blotting and antibodies-1	GM
	2/3	Lab 6: Western blotting/native PAGE	GM
	3	Western blotting and antibodies-2	GM/ELV
	8	Bioaffinity chromatography-1	GM
	9/10	Lab 7: His-tag chromatography	GM/RAE
	10	Bioaffinity chromatography-2	GM
	15	Prep for Lab #8	RAE
	16/17	Lab 8 Kinetics of β-galactosidase	RAE
	17	Circular Dichroism	RAE
	22	Prep for Lab #9	RAE
	23/24	Lab 9: Protein stability by absorbance, fluorescence and CD	RAE
	24	Analysis of spectroscopic data	RAE
	29	Prep for lab #10	RAE
	30/31	Lab 10: Ligand binding project (fluorescence & equilibrium dialysis)	RAE
	31	Principles of Ligand binding	RAE
April	5	Ligand binding data analysis	RAE
	6 & 7	Writing Lab report	RAE
	7	Project Wrap Up	RAE
	12	Synopsis and Review	RAE/GM

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