



UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES COURSE OUTLINE

1. **Course: BCEM 431 – PROTEINS AND PROTEOMICS**

Lecture Sections: L01: MWF 10:00-10:50 SB 142 Fall 2014

Instructor(s): Dr. M.E. Fraser BI 413 403-220-6145 frasm@ucalgary.ca

Desire 2 Learn (D2L) course name: BCEM 431 L01 - (Fall 2014) - Proteins And Proteomics

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

2. **Prerequisites:** Biochemistry 393 and one of Chemistry 353 or 355.
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(s): Credit for both Biochemistry 431 and 531 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:

Assignments	4%
Midterm I	21%
Midterm II	25%
Final Exam	50%

There will be a three-hour final exam scheduled by the Registrar's office.

Each piece of work (assignment, 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.

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. Dates and times of approved class activities:
- | | | |
|-------------------|---------------------------|--|
| Midterm I | Friday, October 3 | During class time, location TBA |
| Midterm II | Friday, November 7 | During class time, location TBA |

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.

6. **Course Materials:** Protein Structure and Function by G.A. Petsko and D. Ringe, New Science Press Ltd., 2004 Edition
7. **Examination Policy:** Calculators can be used on the final exam, but not on the midterm tests. 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 will be a factor in the evaluation. See also [Section E.2](#) of the University Calendar.
10. **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.

11. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Academic Misconduct:** Cheating, plagiarism, or any other form of academic misconduct 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) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [calendar entry on Students with Disabilities](#) and [Student Accessibility Services](#).
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 403-220-5333 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: 403-220-3911 Email: suypaca@ucalgary.ca.
SU Faculty Rep. Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombuds Office](#)
- (g) **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.
- (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.

Department Approval _____ ORIGINAL SIGNED _____ Date _____

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UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

**BIOCHEMISTRY 431
PROTEINS AND PROTEOMICS**

TERM: Fall 2014 **SECTION NO:** L01

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

A student may not register in a course unless (s)he has a grade of at least C- in each prerequisite course. The learning outcomes for Biochemistry 393 can be found here:

http://www.bio.ucalgary.ca/undergrad/Bcem_393_learning_objectives.pdf

Antirequisite(s): Credit for both Biochemistry 431 and 531 will not be allowed.

COURSE COORDINATOR: Dr. M.E. Fraser BI 413 403-220-6145 frasm@ucalgary.ca

LECTURES: MWF 10:00 SB 142

TEXT: Required: Protein Structure and Function by G.A. Petsko and D. Ringe,
New Science Press Ltd., 2004 Edition

Reserve Collection: Please see attached.

MARK DISTRIBUTION:

A.	<u>Composition of Final Grade</u>	
	Assignments	4%
	Midterm I	21%
	Midterm II	25%
	Final Exam	50%

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
N/A

D. Grade Scale

≥86% → A

82 → A-

78 → B+

74 → B

70 → B-

66 → C+

62 → C

58 → C-

54 → D+

50 → D

<50% → F

TENTATIVE SCHEDULE

BCEM 431 Outline - Fall 2014

Introduction to BCEM431	Sept. 8 (Lecture 1)	MEF
Amino acid residues, peptide bond (mostly review)	Sept. 10 (Lecture 2)	MEF
Interactions, secondary structure	Sept. 12 (Lecture 3)	MEF
Representations of protein structure, domains, modularity, motifs	Sept. 15 (Lecture 4)	MEF
Topology diagrams, classification of proteins	Sept. 17 (Lecture 5)	MEF
Quaternary structure, protein flexibility, metastable folds	Sept. 19 (Lecture 6)	MEF
X-ray crystallography	Sept. 22, 24 (Lectures 7, 8)	MEF
Protein Data Bank	Sept. 26 (Lecture 9)	MEF
NMR	Sept. 29 (Lecture 10)	MEF
Ligand-binding I	Oct. 1 (Lecture 11)	MEF
Midterm Test I (Lectures 1-11)	Oct. 3	MEF
Ligand-binding II	Oct. 6 (Lecture 12)	MEF
Homology modeling I, II	Oct. 8, 10 (Lectures 13, 14)	MEF
Thanksgiving	Oct. 13	No lecture
Homology modeling III	Oct. 15 (Lecture 15)	MEF
Protein folding and unfolding <i>in vitro</i>	Oct. 17, 20 (Lectures 16, 17)	MEF
Protein folding <i>in vivo</i> : molecular chaperones; protein folding catalysts	Oct. 22, 24 (Lectures 18, 19)	MEF
Electron microscopy	Oct. 27 (Lecture 20)	MEF
Chemical modifications and cross-linking	Oct. 29, 31 (Lectures 21, 22)	
Metal-binding proteins	Nov. 3, 5 (Lectures 23, 24)	
Midterm Test II (Focusing on lectures 12-24)	Nov. 7	MEF
Remembrance Day	Nov. 11	No lecture
Introduction to proteomics	Nov. 12 (Lecture 25)	MEF
Mass spectrometry	Nov. 14, 17, 19, 21 (Lectures 26, 27, 28, 29)	MEF
Protein regulation: phosphorylation	Nov. 24, 26 (Lectures 30, 31)	MEF
Protein regulation: location, pH, redox environment	Nov. 28 (Lecture 32)	MEF
Protein regulation: proteolysis	Dec. 1 (Lecture 33)	
Protein regulation: glycosylation, lipid modifications	Dec. 3 (Lecture 34)	MEF
Review/catch-up/topic of interest	Dec. 5 (Lecture 35)	MEF
Final exam (Covers the entire course)	3 h scheduled by the Registrar's Office	MEF