UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

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

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|---|---|---|---|---|---|
| Lecture Sections: | L01: | MWF | 10:00-10:50 | ST 127 | Fall 2015 |


| | | | | |
|---|---|---|---|---|
| Instructor(s): | Dr. M.E. Fraser | BI 413 | 220-6145 | frasm@ucalgary.ca |
| | Dr. H. Vogel | BI 423 | 220-6006 | vogel@ucalgary.ca |
| | Dr. Ng | BI 430B | 220-4320 | ngk@ucalgary.ca |


Desire 2 Learn (D2L) course name: BCEM 431 L01 - (Fall 2015) - 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:

| | |
|---|---|
| **Midterm I** | **33.3%** |
| **Assignments (2)** | **4%** |
| **Midterm II** | **29.3%** |
| **Final Exam** | **33.4%** |

There will be a two-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.3 of the University Calendar

5. Dates and times of approved class activities:

| | | | |
|---|---|---|---|
| **Midterm I** | **Thursday, October 15** | **6 - 8 pm** | **Location: ST135** |
| **Midterm II** | **Saturday, November 7** | **2 - 4 pm** | **Location: EDC179** |

**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 second midterm test, but not on the fist midterm test or the final exam. 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.

## 9. 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.

## 10. 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) 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 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/legalservices/foip.

**(f) Student Union Information:** VP Academic Phone: 403 220-3911 Email: suvpaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca;
http://ucalgary.ca/provost/students/ombuds

**(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. Recording of lectures is not permitted without permission of the instructor.

**(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_____

Associate Dean's Approval for
Out of regular class time activity: ORIGINAL SIGNED Date: _____

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

**BIOCHEMISTRY 431**
**PROTEINS AND PROTEOMICS**

**TERM:** **Fall 2015** **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/files/bio/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 |
| OTHER INSTUCTORS: | Dr. H. Vogel | BI 423 | 403-220-6006 | vogel@ucalgary.ca |
| | Dr. Ng | BI 430B | 403-220-4320 | ngk@ucalgary.ca |


LECTURES: MWF 10:00 ST 127

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

MARK DISTRIBUTION:

A. Composition of Final Grade

| | |
|---|---|
| **Midterm I** | **33.3%** |
| **Assignments (2)** | **4%** |
| **Midterm II** | **29.3%** |
| **Final Exam** | **33.4%** |

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
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 2015

| | | |
|---|---|---|
| Introduction to Biochemistry 431 | Sept. 9 (Lecture 1) | MEF |
| Introduction to proteins (mostly review) | Sept. 11 (Lecture 2) | HJV |
| Metalloproteins, cofactors, prosthetic groups | Sept. 14, 16, 18, 21 (Lectures 3-6) | HJV |
| Post-translational modificatons: phosphorylation, lipidation | Sept. 23, 25, 28, 30 (Lectures 7-10) | HJV |
| Protein modules | Oct. 2 (Lecture 11) | HJV |
| Introduction to NMR of proteins | Oct. 5, 7 (Lectures 12, 13) | HJV |
| Representations of protein structure, metastable proteins | Oct. 9 (Lecture 14) | MEF |
| **Midterm Test I (Lectures 2-13)** | **6 - 8 pm Thursday Oct. 15** | **HJV** |
| X-ray crystallography | Oct. 14, 16 (Lectures 15, 16) | MEF |
| Protein Data Bank | Oct. 19 (Lecture 17) | MEF |
| Introduction to proteomics | Oct. 21 (Lecture 18) | MEF |
| Mass spectrometry | Oct. 23, 26, 28, 30 (Lectures 19-22) | MEF |
| Protein regulation: proteolysis | Nov. 2 (Lecture 23) | MEF |
| Protein regulation: location, pH | Nov. 4 (Lecture 24) | MEF |
| Homology modeling I | Nov. 6 (Lecture 25) | KN |
| **Midterm Test II (Focusing on lectures 14-24)** | **2 - 4 pm Saturday Nov. 7** | **MEF** |
| Homology modeling II | Nov. 9 (Lecture 26) | KN |
| Remembrance Day | Nov. 11 | No lecture |
| Reading Days | Nov. 13 | No lecture |
| Homology modeling III | Nov. 16 (Lecture 27) | KN |
| Chemical modifications and cross-linking | Nov. 18, 20 (Lectures 28, 29) | KN |
| Protein folding and unfolding *in vitro* | Nov. 23, 25 (Lectures 30, 31) | KN |
| Protein folding *in vivo*: molecular chaperones; protein folding catalysts | Nov. 27, 30 (Lectures 32, 33) | KN |
| Protein regulation: glycosylation | Dec. 2, 4 (Lectures 34, 35) | KN |
| Review/catch-up/topic of interest | Dec. 7 | KN |
| **Final exam (Focusing on lectures 25-35)** | **2 h scheduled by the Registrar's Office** | **KN** |