



CUMMING SCHOOL OF MEDICINE  
GRADUATE COURSE OUTLINE

<b>COURSE TITLE: Applied Structural Biology</b>			
<b>Course</b>	MDGE 726		
<b>Pre/Co-Requisites</b>	Course Coordinator Permission		
<b>Faculty</b>	Cumming School of Medicine, Graduate Science Education		
<b>Instructor Name(s)</b>	Drs. David Schriemer & Gareth Williams	<b>Email</b>	Dr. Schriemer: dschriem@ucalgary.ca Dr. Williams: gareth.williams2@ucalgary.ca
<b>Office Location</b>	Dr. Schriemer: HRIC 2AA22 Dr. Williams: HRIC 2A18	<b>Office Hours</b>	By arrangement only
<b>Instructor Email Policy</b>	Questions from students sent by email will be replied to within two business days.		
<b>Telephone No.</b>	Dr. Schriemer: 403 210 3811 Dr. Williams: 403 220 8385		
<b>Class Term, Days</b>	Winter 2021, Mar 16, 18, 23, 25, 30, Apr 1, 6, 8		
<b>Class Times</b>	15:00-16:30 T/R		
<b>Class Location</b>	Online		

<b>COURSE INFORMATION/DESCRIPTION OF THE COURSE</b>
<p>Students will learn how to describe structures of biological macromolecules and explain, at a graduate level, the most commonly used methods for determination and analysis of the three-dimensional structure of biomolecules, with a focus on integration of multiple techniques. Instructors will provide an overview of biophysical and structural methods used to study the regulation and function of biomolecules, tutorials on commonly available structural visualization software and resources and how structure-guided drug design is being used for pre-clinical drug discovery.</p>
<b>LEARNING RESOURCES/REQUIRED READING</b>
None

<b>COURSE OBJECTIVES/LEARNING OUTCOMES</b>
<p>Students will learn the concepts and techniques that underpin the field of Integrative Structural Biology (ISB), through a focus on practical applications of the structural technologies that comprise ISB. Specifically, by the end of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the fundamentals of all major techniques being used in protein structure determination.</li> <li>2. Describe the practical issues associated with structure determination using said techniques</li> </ol>



3. Describe how multiple techniques can be combined to increase the range of protein systems amenable to structure analysis, and
4. Achieve familiarity with essential computational resources used to support structure analysis and modeling.

### CUT POINTS FOR GRADES

This course adheres to the grading system outlined in the University of Calgary, Faculty of Graduate Studies Calendar. Grades of A+ and A are not distinguished in the calculation of GPAs. Percentage/letter grade conversion used for this course is as follows

Grade	Grade Point Value	Percentage Conversion	Graduate Description
A+	4.00	95-100	Outstanding
A	4.00	85-94	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.70	80-84	Very Good Performance
B+	3.30	75-79	Good Performance
B	3.00	70-74	Satisfactory Performance
B-	2.70	65-69	Minimum Pass for Students in the Faculty of Graduate Studies
C+	2.30	55-64	All grades below ‘B-’ are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements
C	2.00	50-54	

**Assessment Components:** The University policy on grading related matters is outlined in the [2019-2020 Calendar](#).

Assessment Methods	Description	Weight %	Due Date and Time
Assignment 1	Written assessment of one structure-based technique (strengths and weaknesses and new developments)	30	March 30, 11pm
Assignment 2	Molecular analysis exercise (threading, MD simulation, network modeling, integrative modeling)	30	April 14, 11pm
Presentation	Structural analysis technique (supporting lectures)	20	As scheduled



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Exam	Oral examination (methods in integrative structural biology)	20	April 12
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**ASSESSMENT AND EVALUATION INFORMATION**

**ATTENDANCE AND PARTICIPATION EXPECTATIONS:** The classroom should be respected as a safe place to share ideas without judgement – a community in which we can all learn from one another. Students are expected to conduct themselves in a mature and courteous manner during ALL lectures. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic.

**To be successful, students are expected to attend ALL CLASSES and take notes during class, and should not rely solely on material supplied by the instructors. Missing two or more lectures may jeopardize your ability to pass / achieve a good grade this course.**

**GUIDELINES FOR SUBMITTING ASSIGNMENTS:** Assignments must be submitted according to the specific instructions provided to you by the instructor at the beginning of the course.

**FINAL EXAMINATIONS:** There are no Registrar-Scheduled final examinations for this course.

**EXPECTATIONS FOR WRITING:** Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2018-19 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The University of Calgary values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). The University of Calgary offers a number of instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are strongly encouraged to take advantage of these programs.

**LATE AND/OR MISSING ASSIGNMENTS:** As a general rule, late assignments will not be accepted and will automatically receive a mark of zero. Students who miss a quiz/test will receive a mark of zero unless the instructor has been notified prior to the start of the class. There will be NO exceptions to this policy.

It is the agreement of all Faculty involved in MDGE courses that extensions will NOT be granted. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class or examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>). In this case, alternative arrangements will be made.

**Is a passing grade on a particular component essential to pass the course as a whole? No**

COURSE TIMETABLE		
Course Schedule Date	Topic & Reading	Instructor
March 16	Integrative structural biology - 1	Gareth Williams
March 18	Integrative structural biology - 2	David Schriemer
March 23	X-ray crystallography	Students and instructors
March 25	Nuclear Magnetic Resonance	Students and instructors
March 30	Electron Microscopy	Students and instructors
April 1	Structural Mass Spectrometry	Students and instructors
April 6	Protein interactions – implications for structure determination	Students and instructors
April 8	Modelling	Students and instructors

#### INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION

Cell phones must be turned off in class unless otherwise arranged with the instructor.

The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube). Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/policies/files/policies/electronic-communicationspolicy.pdf>.

#### MEDIA AND RECORDING IN LEARNING ENVIRONMENTS



### **Media recording for lesson capture**

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

### **Media recording for assessment of student learning**

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

### **Media recording for self-assessment of teaching practices**

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

### **Student Recording of Lectures**

Audio or video recording of lectures is prohibited except where explicit permission has been received from the instructor.

## **UNIVERSITY OF CALGARY POLICIES AND SUPPORTS**

### **ACADEMIC ACCOMMODATIONS**

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/). Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full



policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>

### **IMPORTANT INFORMATION**

Any research in which students are invited to participate will be explained in class and approved by the appropriate University Research Ethics Board

### **COPYRIGHT**

It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University's Fair Dealing Guidance for Students ([library.ucalgary.ca/files/library/guidance\\_for\\_students.pdf](http://library.ucalgary.ca/files/library/guidance_for_students.pdf)). Further information for students is available on the Copyright Office web page (<https://library.ucalgary.ca/copyright>)

### **A NOTE REGARDING INSTRUCTOR INTELLECTUAL PROPERTY**

Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor (s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course *at the same time* may be allowed under fair dealing

### **ACADEMIC INTEGRITY**

The Cumming School of Medicine expects intellectual honesty from its students. Course participants should be aware of University policies relating to Principles of Conduct, Plagiarism and Academic Integrity. These are found in the printed Faculty of Graduate Studies Calendar, or online under Academic Regulations in the Faculty of Graduate Studies Calendar, available at [Faculty of Graduate Studies Academic Regulations](#)

### **ACADEMIC MISCONDUCT**

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

### **EMERGENCY EVACUATION AND ASSEMBLY POINTS**

Assembly points for emergencies have been identified across campus. The primary assembly points for South Campus (Health Science Centre (HSC); Health & Research Innovation Centre (HRIC); Heritage Medical Research Building (HMRB) and Teaching, Research and Wellness (TRW)) are:

- HSC and HMRB: HRIC Atrium (alternate assembly point is Parking Lot 6)
- HRIC: HMRB Atrium (alternate assembly point is Parking Lot 6)
- TRW: McCaig Tower (alternate assembly point is HMRB – Atrium)

### **APPEALS**

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section N of the Faculty of Graduate Studies Calendar. Students must follow the official process and should contact the Student Ombuds Office (<http://www.ucalgary.ca/provost/students/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct



### **THE FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY (FOIP) ACT**

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission

### **WELLNESS AND MENTAL HEALTH RESOURCES**

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 excellent 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), <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services> and the Campus Mental Health Strategy website <https://www.ucalgary.ca/mentalhealth/>

### **SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY**

**Student Ombudsman:** The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit [www.ucalgary.ca/ombuds/](http://www.ucalgary.ca/ombuds/) or email [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)

**Student Union:** The SU Vice-President Academic can be reached at (403) 220-3911 or [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca); Information about the SU, including elected Faculty Representatives can be found here: <https://www.su.ucalgary.ca>

**Graduate Student's Association:** The GSA Vice-President Academic can be reached at (403) 220- 5997 or [gsa.vpa@ucalgary.ca](mailto:gsa.vpa@ucalgary.ca); Information about the GSA can be found here: <https://gsa.ucalgary.ca>

### **SAFEWALK**

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.