

# CHEMISTRY 203 – Survey of Physical Chemistry

Fall 2023

## Course Information



### SUCCESS IN CHEMISTRY

I believe that anyone can do well in Chem203. Chemistry, especially physical chemistry, can be challenging – I want you to enjoy the challenge and learn about chemistry and its applications. I have added flexibility and repetition in the course and to the evaluation scheme to ensure you have chances to learn and improve throughout the semester. Quizzes will help you keep up with the content regularly and prepare you for the exam and final exam. Reviews are meant to prepare you for each class. These small component assessments are designed purposefully to encourage interaction among students and help you learn the content by repetition.

In this course, we will learn physical chemistry concepts and apply them to relevant problems in biological systems.

### TEACHING TEAM

#### Instructor

Dr. Pallavi Sirjoosingh ([pallavi.sirjoosingh@mcgill.ca](mailto:pallavi.sirjoosingh@mcgill.ca))

Otto Maass 100

I will hold regular office hours each week, where you can drop-in to ask questions about the content. The time for the office hours will be announced on myCourses.

#### Teaching Assistants (TAs)

David Hiraki

Sylvester Zhang

### COURSE STRUCTURE AND INFORMATION

#### Lecture/Class Time

CHEM-203-001      Mon/Wed/Fri (Otto Maass 112)      12:35 – 1:25 pm

Lectures will be in-person but will be recorded. Every effort to record all lectures will be made, but most of this process is out of the control of the instructor, so some recordings may be delayed and in some extreme cases missing.

**Reading Break:** 6<sup>th</sup> to 11<sup>th</sup> October

**Make-up day:** November 30; the normal Thursday schedule of course lectures, labs, and conferences will be replaced by a **Monday** schedule.

#### Course Website:

<https://www.mcgill.ca/mycourses/>

Click 'Log in to myCourses' and use McGill username and password

"Fall 2023 - CHEM-203-001 " – Survey of Physical Chemistry

## COURSE MATERIAL

We will cover basic concepts and problems in Thermodynamics and Chemical Kinetics with an emphasis on biological examples to illustrate Work, Enthalpy, Heat Capacity, the 1st Law of Thermodynamics, Entropy and 2nd Law of Thermodynamics, Gibbs and Helmholtz Free Energies, Chemical potential, Chemical equilibrium, Chemical kinetics and Enzyme kinetics.

### Slides/Videos

Course slides will be available as PDF files on myCourses. I encourage you to add your own notes during lectures or in advance. For certain topics, I will also post additional videos that you can watch in advance of the lectures to prepare you for the class.

### Textbook

Physical Chemistry for the Life Sciences, Third Edition, Peter Atkins, Julio de Paula, George Ratcliffe, and Mark Wormald

Print ISBN 9780198830108, (Cost 179.99\$)

Print and ebook copies are also available at the McGill library. Please see the myCourses page for details on how to access the textbook.

### In-Class Polling 'Slido'

Polling will be used in this course as a self-check for your understanding of course content, to provide us with feedback, and to enhance your engagement in class.

During class, you will be asked to respond to questions (not graded) from the instructor from a personal device (smartphone, tablet, or laptop). Please come to class with your devices charged and connected to the Internet. If you do not have a phone, tablet, or laptop to use for polling questions, and wish to participate, please contact the instructor immediately for appropriate arrangements to be made. Polling will be available through [www.mcgill.ca/polling](http://www.mcgill.ca/polling) using your McGill username/password.

### Calculator

Any non-programmable/non-graphing calculator is required (e.g., CASIO fx-991MS or Sharp EL510), as graphing or text storage calculators will not be permitted in in-person final examinations at McGill.

## COURSE EVALUATION

Grade Item				
	<b>Quizzes+Reviews+Participation = 30%</b> <b>(Best of two choices)</b>			
<b>Quizzes</b>	20%		25%	
<b>Reviews Assignment</b>	5%		5%	
<b>Reviews Participation</b>	5%		0%	
	<b>MTs + Final = 70%</b> <b>(Best of four choices)</b>			
<b>Midterm 1</b>	15%	0%	15%	0%
<b>Midterm 2</b>	15%	15%	0%	0%
<b>Final Exam</b>	40%	55%	55%	70%

### Quizzes

Timed multiple choice/multi-select quizzes held through myCourses. You will have 1 attempt for each quiz. Each quiz will be timed and is worth 10 points (8 quizzes = 80 points total). The points for each quiz will be added together, and the total will be graded out of 60 points (Maximum points possible: 60). There will be no make-up or deferred quizzes.

### Reviews Assignment and Participation (10 out of 15 reviews required for full credit)

~5-10 minutes of short recap of content, called Reviews, will precede certain scheduled lectures. Students will be given ~1-2 questions in advance that they submit answers to, on Crowdmark. 15 total reviews scheduled. Each review component (assignment and/or participation) is pass or fail.

To get full credit for each **Review Assignment**, students need to submit a credible attempt for assigned questions, on Crowdmark. Each review assignment is worth 0.5% (maximum up to 5%), so you need to submit 10 review assignments, out of the 15, to earn the maximum points. You do not need to attend the review to get credit for the review assignment.

Participation in-class will be recorded during 15 review sessions.

To get full credit for **Review Participation**, students must attend 10 of the 15 scheduled review sessions. Participation in each session is worth 0.5% (maximum up to 5%). More details on this will be available on myCourses.

There will be no make-up or deferred reviews.

**Quizzes, Review Assignments, and Participation** add up to 30% of your overall grade. At the end of the semester, your overall grade will be calculated using both schemes, and the best option will be applied to your final calculated grade. You do not need to make a choice.

### **Midterm Exams (MT) (In-Class; Timed)**

Two midterm exams will be administered during class time. The format and details of the exam will be made available closer to the date of the exams.

#### **Tentative dates:**

**Midterm 1:** Monday, October 2<sup>nd</sup>, 2023 (12:35 pm to 1:25 pm Otto Maass 112)

**Midterm 2:** Wednesday, November 8<sup>th</sup>, 2023 (12:35 pm to 1:25 pm Otto Maass 112)

(More details will be posted on myCourses closer to the exam date)

There is **no deferred date** for the midterm exams. If you miss the exam, the grade will be distributed to the final exam.

### **Final Exam (In-Person, Date: TBA)**

There will be a cumulative final exam during the final exam period. The date for the final exam is to be decided by the Exam Office. Room assignments/dates for the final exam are handled by the Exam Office (posted in November).

*Please be clear that no instructor at McGill is authorized to alter the time/date of a final exam or to offer a special writing opportunity; these issues can only be dealt with at the McGill Service Point. If you have too many exams in a brief period of time, please consult: <http://www.mcgill.ca/conted-students/exams/conflicts/>*

**You must take the final exam to pass the course.**

**Midterms and Final Exam** add up to 70% (75% for Lab exempt) of your overall grade. At the end of the semester, your overall grade will be calculated using the two schemes, and the best option will be applied to your final calculated grade. You do not need to make a choice.

### **Online Access Requirements**

For all online platforms, it is important that you register and sign-in with your @mail.mcgill.ca email address. Using a different account (i.e., Gmail, iCloud, etc.) may result in issues with access and evaluation of your work.

### **Supplemental Exam**

This course will have a supplemental exam worth 100% of the grade

### ***Policy Statement on Academic Integrity***

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/) for more information)  
(Approved by Senate on 29 January 2003)

### ***Policy Statement on Language***

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded. (Approved by Senate on 21 January 2009)

Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue).

### ***Policy Statement on Extraordinary circumstances***

In the event of extraordinary circumstances, the content and/or evaluation scheme in this course is subject to change.

### ***Policy Statement on Course Material***

Instructor-generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

### ***Policy Statement on Diverse Learners***

As instructors of this course, we endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with us and the Student Accessibility and Achievement, 514-398-6009.

## LEARNING OBJECTIVES AND COURSE SCHEDULE

### Learning Objectives

At the end of this course, you will be able to apply concepts of thermodynamics and kinetics to understanding their applications in chemical and biological context.

### Topics Covered

Work and Heat (Topic 1A)

Internal Energy/Enthalpy (Topic 1B)

Calorimetry (Topic 1C)

Applications of Enthalpy (Topics 1D/1E)

Entropy (Topics 2A/2B)

Gibbs Energy/ Chemical Potential/Solutions (Topics 2C/Parts of 3A-3D)

Equilibria/Proton transfer reactions/Electron transfer reactions (Parts of Topics 4A-4G; 5A-C)

Reaction Rates/Kinetics (Parts of Topics 6A-6D)

Biochemical Kinetics (Parts of Topics 7A-7D)