

Title: **Elements of Physical Chemistry**

Webpage: <http://www.chemistry.montana.edu/callis/courses/chmy361/index.html>

Description: This a 4 credit survey of physical chemistry directed towards biochemistry and biological science professions, *but useful for any field.*

Objectives: Physical chemistry applies the fundamental principles of physics to chemistry--and therefore to biology, geology, etc.--because these depend on chemical processes at the microscopic level. The course endeavors to provide an overview of the physical chemistry concepts and applications that are most relevant to biological sciences. The ability to solve problems involving the important principles and equations will be taught along with the concepts. Mathematics will be treated as a *language* and the relevant concepts will be lightly reviewed as needed.

Prerequisites: M 161Q or M 172Q and PHSX 207, and CHMY 211 or CHMY 323 or CHMY 333 , and CHMY 311, or consent of instructor.

Instructor: Patrik Callis, Office: Room 55 CBB; phone 5414; fax 5407; email: pcallis@montana.edu

Time & Place: MTRF 8-8:50 am, **Room 30, Gaines Hall (GH030)**

Office Hours: Will be announced or by appointment or drop in.

Lab Course: Chmy 362 or 372 (1 credit); recommended and is required for a number of chemistry options.

Text: *Physical Chemistry (Principles and Applications in Biological Sciences* by Tinoco, Saur, Wang, Puglisi, Harbison, and Rovnyak, **5th Edition.**, Prentice Hall. This edition—unlike previous editions—is considerably reorganized. *Using a previous edition will not work well.*

Exams: There will be 4 midterm exams and a comprehensive final exam. The midterms are planned for **Tue Sept 19; Fri., Oct 13; Thur., Nov 9; and Fri. Dec. 1.** *These are subject to change.* The final is scheduled by the Registrar, and according to the Fall Exams and Finals Schedule (see page 3 below), is on **Tuesday, Dec 12, 4-5:50 PM.**

Grading: Graded homework assignments will be given for each chapter. The total homework and midterms are worth 100 points each and the final is worth 200 points, giving a total of 700 points. **The first homework will be due Tue. September 12.**

Advice: This is a challenging--*but rewarding and useful*--subject that requires **many hours of individual study.** **Look at the material before the lectures. Study the lectures posted on the website following the in-class lecture. Practice solving problems.**

Much of the material in this course was introduced in **General Chemistry.** You will find that reading your general chemistry chapters on thermodynamics and kinetics will be **quite helpful** as supplemental reading. You are **strongly encouraged** to have access to such a text during this course.

<u>Subject</u>	<u>Aprox. # of Lectures</u>	<u>Reading</u>
Introduction	1	Ch. 1
First Law of Thermodynamics	6	Ch. 2
Second Law of Thermodynamics	8	Ch. 3
Free Energy & Chemical Equilibria	4	Ch. 4
The Statistical Foundations of Biophysical Chemistry	3	Ch. 5
Physical Equilibria	4	Ch. 6
Electrochemistry	2	Ch. 7
The Motions of Biological Molecules	4	Ch. 8
Kinetics: Rates of Chemical Reactions	3	Ch. 9
Enzyme Kinetics	1	Ch. 10
Molecular Structure & Interaction: Theory	2	Ch. 11
Molecular Structure & Interaction: Biomolecules	3	Ch. 12
Optical Spectroscopy	3	Ch. 13
Magnetic Resonance	2	Ch. 14
Climate Change	2	
Review for Final	2	

* Subject to change

Reading for Chapters 1-2 (Suggested pace for *initial* reading, designed to finish Chapter 1 one week before homework is due. Read again as needed)

pages

Mon, Aug. 28 preface, 1-11

Tue, Aug. 29 13-21

Thur, Aug. 31 22-30

Fri, Sep. 1 31-39

Tue. Sep. 5 40-47

2017 Fall Semester Calendar from Web

August 28 Classes Begin
 September 4 Labor Day Holiday No Classes; Offices Closed
 November 10 Veteran's Day Holiday No Classes; Offices closed.
 November 22-24 Thanksgiving Day Holiday
 No classes from Nov. 22-24. Offices are open on Nov. 22, but are closed Nov. 23-24.
 December 8 Classes End
 December 11-15 Final examinations December 15
 Fall Semester ends
 December 16 Fall Commencement 2017

2017 Fall Semester Schedule of Finals Week Exams

Course Sequence for classes whose first class day of the week is M,W, or F.			
Regular Course		Final Exam	
Meeting Time		Period/Date	
8:00 a.m.	4-5:50pm	.....	Dec 12
9:00 a.m.	4-5:50pm	.....	Dec 14
10:00 a.m.	8-9:50am	.....	Dec 12
11:00 a.m.	4-5:50pm	.....	Dec 11
12:00 p.m.	8-9:50am	.....	Dec 14
1:00 p.m.	8-9:50am	.....	Dec 13
2:00 p.m.	8-9:50am	.....	Dec 11
3:00 p.m.	6-7:50pm	.....	Dec 14
4:00 p.m.	8-9:50am	.....	Dec 15

Montana State University Diversity Statement:

Montana State University considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. MSU expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. Dimensions of diversity can include sex, race, age, national origin, ethnicity, gender identity and expression, intellectual and physical ability, sexual orientation, income, faith and non-faith perspectives, socio-economic status, political ideology, education, primary language, family status, military experience, cognitive style, and communication style. The individual intersection of these experiences and characteristics must be valued in our community. If there are aspects of the design, instruction, and/or experiences within this course that result in barriers to your inclusion or accurate assessment of achievement, please notify the instructor as soon as possible and/or contact Disability Services or the Office of Institutional Equity.

(Adopted from University of Central Florida)

Diversity Statements for this class:

Respect for Diversity: It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexual orientation, disability, age, socioeconomic status, ethnicity, race, religion, culture, perspective, and other background characteristics. Your suggestions about how to improve the value of diversity in this course are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, in scheduling exams, I have attempted to avoid conflicts with major religious holidays. If, however, I have inadvertently scheduled an exam or major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements. (Adopted from University of Iowa)

Students in this class are encouraged to speak up and participate during class meetings. Because the class will represent a diversity of individual beliefs, backgrounds, and experiences, every member of this class must show respect for every other member of this class.

(Adopted from California State University)

Inclusivity Statement: I support an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength. We expect that students, faculty, administrators and staff at MSU will respect differences and demonstrate diligence in understanding how other peoples' perspectives, behaviors, and worldviews may be different from their own.

(Adopted from University of Northern Colorado)