

Chemistry 235 – Kinetics of chemical reactions

Syllabus for Winter 2017– Section 51

GENERAL INFORMATION

This 3-credit course introduces students to the theory and measurement of chemical reaction rates. It requires CHEM 234 (Physical Chemistry I), and it is a prerequisite for the following courses: CHEM 324 (Organic Chemistry III), CHEM 326 (Natural products), CHEM 327 (Organic Chemistry of polymers), CHEM 334 (Physical Chemistry Laboratory), CHEM 335 (Biophysical Chemistry), CHEM 421 (Physical Organic Chemistry), CHEM 424 (Organic Synthesis), CHEM 435 (Interfacial Phenomena), CHEM 445 (Industrial Catalysis) and CHEM 451 (Nanochemistry).

Course format: Lectures and laboratories

Instructor: Dr. Guy Paquette
Office: SP-201.14
Office hours: Monday: 15h30 to 17h00
Email : guy.paquette@concordia.ca

Lectures: Monday: 18h00 to 20h30
Location: HC-157

Lab Instructor: Zornitsa Stoyanova
Office: SP-201.07
Office hours : by appointment
Email : zornitsa.stoyanova@concordia.ca

Laboratories:

Section 5102:	Monday: 13h30 - 17h30 in SP-220
Section 5103:	Wednesday: 13h30 - 17h30 in SP-220
Section 5104:	Thursday: 13h30 - 17h30 in SP-220
Section 5151:	Wednesday: 18h30 – 22h30 in SP-220
Section 5156:	lab exempt

Recommended Textbook:

Physical Chemistry : Thermodynamics, Structure and Change. 10th Edition, by Peter Atkins & Julio de Paula, W.H Freeman and Company, 2014

This document is adapted from:

Concordia Advocacy and Support Services: *Course Syllabus Template*.

Davis, B.G. (1993). *Tools for teaching*. New York: Jossey-Bass.

Gunert, J. (1997). *The course syllabus: A learning-centered approach*. Bolton: Anker.

McGill Centre for University Teaching and Learning: *Course Outline Brief Guide*.

COURSE OUTLINE:

The following topics will be covered: molecular motion in gases and liquids; experimental techniques; theories of reaction rates; steady-state approximation; unimolecular reactions; enzyme catalysis; some elements of reaction dynamics (collision theory, diffusion-controlled reactions, transition state theory).

COURSE GRADE

The final mark is based on: 35% for the 2 midterm exams (15% each), 40% for the final, and 25% for laboratories. The grade for laboratories includes pre-lab, lab performance, lab reports and lab exam; the lab exam will be written in class, will last 30 minutes and will be worth 5% of the final mark. See the lab Moodle webpage for details.

Bonus points: a few unannounced in-class quizzes will allow for a total of up to 6 bonus points.

In order to pass the course, a minimum of at least 60% (15/25) on the lab component, and of at least 50% (37.5/75) on the theory component are required (bonus points are not counted into theory component).

If a student is absent from a midterm exam, an official written justification must be provided, (i.e. an appropriately signed doctor's note). This justification should be delivered to the instructor **no later than one week after the exam**. If there is no valid justification, the student will receive a mark of zero for the exam. If the reason for absence is valid, the other midterm exam will be worth 35% of the final mark.

Grade equivalence:	%	Grade
	0 – 40	R
	40 – 50	F
	50 – 53	D-
	53 – 56	D
	56 – 60	D+
	60 – 63	C-
	63 – 66	C
	66 – 70	C+
	70 – 73	B-
	73 – 76	B
	76 – 80	B+
	80 – 85	A-
	85 – 90	A
	90 – 100	A+

IMPORTANT DATES

- Lectures for CHEM 235/3, section 51, begin Monday Jan. 9th
- Laboratories begin during the week of January 16th
- Deadline to withdraw with tuition refund (DNE) is Sunday, Jan. 22nd.

- Mid-term exams: Monday, Feb. 6th, and Monday, March 13th.

- Last day to withdraw (DISC) is Sunday, March 19th.
- Lectures end Thursday, April 13th.
- Final exam period is from Wednesday, April 19th to Tuesday, May 2nd . Final exam date, TBA.

(In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change)

LECTURE MATERIAL AND PRACTICE PROBLEMS

All concepts related to the course material will be covered in the lectures. The students are expected to read the appropriate sections of the textbook. There are no formal assignments for this course, but a list of suggested practice problems from the book will be provided with each section. It is the student's responsibility to use these problems to practice in applying the course material.

LABORATORY INFORMATION

All questions on matters related to the labs should be addressed to the Lab Instructor. **Laboratories start on the week of January 16th** . Labs will be performed on a rotation basis, so that students will be performing one lab experiment every other week.

Although lab experiments are done with a lab partner, each student must submit an individual lab report for all experiments. Joint lab reports are not acceptable. Do not expect any particular lab experiment to be directly related to the material covered in lectures of the preceding week; consider the laboratory work as additional, independent learning experience.

LABORATORY MANUAL AND MATERIALS

The lab manual for the five experiments can be found online from the CHEM 235 Moodle website. You do not need to purchase the lab manual, but should print out the necessary pages from the website. Other items such as lab coats and safety glasses (mandatory) are available at the bookstore.

LABORATORY EXEMPTION

Students who are repeating the course, having passed the lab component within the past 2 years, may request a lab exemption. A student who is eligible for a lab exemption must apply for it before the end of the first week of the term, i.e. prior to the start of the laboratory experiments (forms available in SP-201.01 and on the departmental website). Once accepted, students must register for the appropriate lab exemption section (Section 0156); students registered in the other lab sections will be required to complete the lab portion of the course. Students who withdraw from the course (DISC) are not eligible for a lab exemption based on labs completed in the term for which there is a DISC notation.

CALENDAR FOR LECTURES

Please note that this calendar may be changed as the term proceeds. The chapter numbers indicated relate to the 10th edition of the textbook.(Physical Chemistry, by Atkins & de Paula)

Date	Topics	Reading
Jan. 9 th	Intro; molecular motion in gases & liquids	19A -19B -19C
Jan. 16 th	Experimental techniques; rate laws	20A
Jan. 23 rd	Integrated rate laws; rx approaching equil.	20B - 20C
Jan. 30 th	Problems in class	
Feb. 6 th	First midterm exam (90 minutes)	
Feb. 13 th	Arrhenius equation; Accounting for the rate laws	20D – 20E
Feb. 20 th	Midterm break	
Feb. 27 th	Examples of reaction mechanisms	20F
March 6 th	Problems in class	
Mar. 13 th	Second midterm exam (90 minutes)	
March 20 th	Enzymes	20H
March 27 th	Collision theory	21A
April 3 rd	Diffusion controlled reactions; Transition state theory	21B – 21C
April 10 th	Problems in class	
TBA	Final exam (covers all material)	

PROPER ACADEMIC CONDUCT:

The academic code of conduct can be found in section 17.10 of the academic calendar (<http://registrar.concordia.ca/calendar/pdf/sec17.pdf>).

The Department of Chemistry and Biochemistry offers a seminar on the academic code of conduct, and the appropriate use of information sources which aims to clarify what practices will be considered unacceptable with regards to work submitted for grading in Chemistry and Biochemistry courses. Attendance at this seminar is **recommended** and represents a clear and fair opportunity to learn what our faculty regards as academic misconduct.

Any form of cheating, copying/plagiarism found in this course will be reported, and the appropriate sanctions applied.

Failure to take part in this learning opportunity and thus ignorance of these regulations is no excuse, and will not result in a reduced sanction in any case where academic misconduct is observed. This short seminar (1 hour) will be held numerous times (note that late-comers will not be admitted):

As space for each of the seminars is limited by the room size, please sign up to your preferred time. Sign-up sheets are available outside SP 201.01 (Departmental office).