

Chemistry 1105 R10
COURSE PRESENTATION
Spring 2024

We at Kwantlen Polytechnic University respectfully acknowledge that we live, work and study in a region that overlaps with the unceded traditional and ancestral First Nations territories of the Musqueam, Katzie, Semiahmoo, Tsawwassen, Qayqayt, and Kwikwetlem; and with the lands of the Kwantlen First Nation, which gifted its name to this university.

In the cause of reconciliation, we recognize our commitment to address and reduce ongoing systemic colonialism, oppression and racism that Indigenous Peoples continue to experience..

Important - This course will have in-person face-to-face sessions

Course: Chemistry 1105 R10
Classroom: Richmond Main, room 3625
Lab Room #: Richmond Main, room 3380
Phone/VM: (604) 599-2550

Instructor: Patrick Duffy
Class Hours: 12 – 2 Tuesdays and Thursdays
Office Room #: Richmond Main, room 3345
Office Hours: 12 – 1 Mondays and Wednesdays,
Tuesdays 2 – 3.

Email: patrick.duffy@kpu.ca

Web: <http://wordpress.kpu.ca/chem>

COURSE FORMAT

IMPORTANT: This course has in-person face-to-face sessions. The schedule is as follows:

Classes are in-person every Tuesday and Thursday from 12 – 2 with the exception of statutory holidays. Labs are all in person and are on the day and time for which you signed up for them. Labs take place every week unless otherwise indicated by the lab schedule.

COURSE DESCRIPTION

Students will learn: Chemical formula calculations, stoichiometry, molarity of solutions, limiting reagents & percent yields, thermochemistry, freezing point depression, boiling point elevation, liquids and gases, acids and bases, ionic equilibria, chemical equilibria, and oxidation and reduction. They will also perform laboratory work. Students with credit for ENVI 1106 may not take this course for further credit towards graduation requirements.

LEARNING OUTCOMES

- Describe the properties of gases and solve problems involving the gas laws and gas stoichiometry
- Explain the concepts of energy changes in chemical reactions and phase changes and solve thermochemical and calorimetric problems
- Explain the fundamental differences between electrolytes and non-electrolytes, and solve problems on solution stoichiometry
- Explain the concepts involved in chemical equilibria and the variables affecting a system in equilibrium and solve equilibrium problems using the equilibrium constant expression
- Define Arrhenius and Bronsted acids and bases, weak and strong acids and bases, describe titration curves for various acid-base titrations, and calculate pH, hydrogen and hydroxide ion concentrations, and equilibrium constants of weak acids and bases
- Calculate oxidation numbers and balance oxidation-reduction equations
- Carry out gravimetric and volumetric (including acid-base and redox) analyses, calorimetric determinations, pH and dissociation constant determinations, and other experiments illustrating the concepts dealt with in the lecture course

TENTATIVE SCHEDULE OF TOPICS

Matter, Measurement, and Problem Solving (Chapter 1) – Scientific method; Law of conservation of mass, classification of matter, properties of matter: physical versus chemical properties and changes; measurement and significant figures; SI base units; derived units, units and dimensional analysis. (2 lectures)

Atoms and Elements (Chapter 2) – Atomic theory, structure of the atom, isotopes, atomic mass, periodic table of the elements. (2 lectures)

Compounds (Chapter 3, sections 3.1 – 3.6) – Formulae and naming of ionic and molecular compounds (1 lecture)

Chemical reactions (Chapter 5, section 5.1 and Chapter 6, sections 6.3 – 6.5) – Ionic theory of solutions, solubility rules, molecular and ionic equations, precipitation reactions, acid-base reactions, oxidation-reduction reactions (identifying redox reactions, identifying oxidizing and reducing agents; determining oxidation numbers), balancing redox equations by the half-reaction method (3 lectures)

The Mole and its Use in Chemical Formulae and Equations (The rest of Chapters 3, 5, and 6, and all of Chapter 4) –Molecular mass and formula mass, the mole concept, mass percentages from the formula, elemental analysis, determining formulas, molar interpretation of a chemical reaction, amounts of substances in a chemical reaction, limiting reactant, theoretical and percentage yields, molar concentration, diluting solutions, gravimetric analysis, volumetric analysis. (4 lectures)

The Gaseous State (Chapter 7) –Gas pressure and its measurement; empirical gas laws; STP, ideal gas law, molar mass determination and gas densities, stoichiometry problems involving gas volumes; gas mixtures and the Law of Partial Pressures. (2 lectures)

Thermochemistry (Chapter 8) – Energy and its units; heat of reaction; enthalpy and enthalpy change, thermochemical equations, applying stoichiometry to heats of reaction, measuring heats of reaction, Hess' Law, standard enthalpies of formation, fuels. (3 lectures)

Chemical Equilibrium (Chapter 9) – Dynamic equilibrium, the equilibrium constant, heterogeneous equilibria, the qualitative interpretation of the equilibrium constant, predicting the direction of reaction, calculating equilibrium concentrations, using Le Chatelier's Principle to predict the effects of: changing amounts of reactants or products, changing pressure or temperature and the effect of a catalyst, on a system at equilibrium. (3 lectures)

Acids and Bases (Chapter 10) – Acid-base concepts (Arrhenius and Brønsted-Lowry), relative strengths of acids and bases, self-ionization of water, solutions of a strong acid or base, pH, acid-ionization equilibria, base-ionization equilibria, acid-base properties of salt solutions, common-ion effect, buffers; titration curves of: strong acid and strong base; weak acid and strong base. (4 lectures)

REQUIRED TEXTBOOKS AND MATERIALS:

Chemistry 1105 lab manual, one laboratory notebook, and a lab coat

Contact lenses may not be worn in the laboratory. Glasses are therefore required for people who normally wear contact lenses.

Calculator: Sharp EL-531 or equivalent non-programmable

Textbook: *Introductory Chemistry (open textbook adapted by KPU Chemistry Department)*

DETAILED SUMMARY OF EVALUATION SCHEME

Lecture		Laboratory	
Three Exams	40	Lab Reports/Unknowns	22
Final Exam	30	Lab Exam	8

What follows are the guidelines used to determine your final grade in Chemistry 1110. Please note the restrictions placed on your grade by both the lab component of the course and your performance on the final exam.

To get a(n):	Your overall mark (including the final and lab) must be:	And within that, you must get at least the following on the final:	And in the Lab:
A+	90 – 100	80%	All work must be complete, and you must have an overall lab mark of at least 65%
A	85 – 89	70%	
A-	80 – 84	65%	
B+	76 – 79	60%	All work must be complete, and you must have an overall lab mark of at least 60%
B	72 – 75	60%	
B-	68 – 71	55%	
C+	64 – 67	50%	All work must be complete, and you must have an overall lab mark of at least 50%
C	60 – 63	40%	
C-	56 – 59	40%	
D	50 – 55	N/A	N/A
F	<50	N/A	N/A

Here is how Kwantlen interprets the grade you'll get:

Grade	Grade Points	Conversion Scale (%)	Definition
A+	4.33	90 - 100	Exceptional Achievement
A	4.00	85 - 89	Outstanding Achievement
A-	3.67	80 - 84	Excellent Achievement
B+	3.33	76 - 79	Very Good Achievement
B	3.00	72 - 75	Good Achievement
B-	2.67	68 - 71	Good Achievement
C+	2.33	64 - 67	Satisfactory Achievement
C	2.00	60 - 63	Satisfactory Achievement
C-	1.67	56 - 59	Minimal Achievement. This grade does not permit student to pursue another course for which the graded course was a prerequisite.
D	1.00	50 - 55	Minimal achievement. This grade does not permit student to pursue another course for which the graded course was a prerequisite.
F	0.00	0 - 49	Unsatisfactory achievement. Student did not meet minimum course requirements.

INSTRUCTOR/CLASSROOM POLICIES:

Any in-class exam not written by the student will be assigned a grade of zero unless the student can produce relevant documentation supporting the necessity of their absence. If such documentation is produced, the weights of the other exams will be increased so that the student will not be penalized for missing the exam. If the student is unable to write an exam, he or she must notify the instructor **before the scheduled exam time**. Labs missed without a valid excuse will result in an incomplete grade being assigned to the laboratory portion of the course.

Students requiring accommodation for a disability in chemistry 1105 must ensure that the accommodation notice (from a Disability Advisor) covers both the lecture and the lab. A lab assistant accommodation must be approved by a Disability Advisor; the student must arrange this before the first lab. The Chemistry Department may provide suggestions regarding finding a suitable lab assistant, however finding a lab assistant remains a student responsibility.

ADDITIONAL COSTS TO STUDENTS

Students are responsible to provide their own cloth face masks and any other Personal Protective Equipment specific to this course.

IMPORTANT DATES

For important information on deadlines for refunds, last day to add or drop a course, withdrawal, etc., please go to the Dates and Deadlines page in the Registration Guide:

<https://www.kpu.ca/registration/dates>

Term test #1	February 1 (Thursday)
Reading Break (no class)	February 20, 22
Term test #2	February 29 (Thursday)
Term test #3	March 28 (Thursday)
Final Chemistry 1105 lecture	April 11 (Thursday)
Final exam period	April 13 – 22
CHEM 1105 Final Exam (12 – 3 PM, Room TBA)	April 16 (Tuesday)

KPU POLICIES

All KPU policies can be found at: www.kpu.ca/policies

Policy No. HR15 – Diversity and Inclusiveness

Policy No. ST2 – Student Academic Integrity

Policy No. ST11 – Attendance and Performance in Semester and Other Term Based Courses

Policy No. ST7 – Student Conduct (Non-Academic)

Policy No ST14 – Services for Students with Disabilities

LEARNING SUPPORT AND ACCOMMODATIONS

Early Alert System

During the course of the semester, if I am concerned about your progress, I may use the Early Alert Response System (EARS) to connect you with services who will work with you to find additional resources or supports that may increase your chances of success. Such assistance may include putting you in touch with an academic advisor, a tutor, financial aid, a counsellor, or another faculty member. Please be advised that the information is shared with those on a need to know basis and is sent because I care about your progress and success in this course. For more information check the website – <https://www.kpu.ca/advising/earlyalert>

Accessibility Services

KPU is committed to creating a learning environment that meets the needs of all the learners. If you anticipate or experience disability-related issues or barriers in this course, please meet with me. Together we can plan how to best support your learning and coordinate your accommodations. You are also encouraged to contact Accessibility Services at kpu.ca/access or email access@kpu.ca or call 604-599-2001

Other student services:

[Academic Advising](#) – please see an advisor if you have questions about course selection, program declaration, or program progression. If you are domestic student consult Central advising in year 1 or 2 and a Science advisor in year 3 or 4. If you are an international student, please consult an international advisor.

[Counselling Services](#) – please see a counsellor for any personal concerns or if you are needing extra support.

[The Learning Centres](#) – Please consult with learning centre tutors or learning strategists for any academic support you require. All services are FREE!

[KPU Academic Integrity Moodle Course](#)

[Student Rights and Responsibilities](#)

[IMPORTANT Dates and Deadlines for KPU students](#)