
CHEM 111 THE STRUCTURE OF MATTER

INSTRUCTOR: Ernie Prokopchuk, PhD

OFFICE HOURS: Tuesday and Thursday, 2:00 – 3:30 or by appointment.
**Open door policy is in effect outside of these office hours.*

OFFICE LOCATION: A2513

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COURSE OFFERINGS

DAYS & TIMES:

Classes:	Tues. and Thurs., 10:00 am - 12:00 pm
Room:	A2603
Lab:	Monday or Friday, 1:00 pm – 4:00 pm
Room:	A2803

COURSE DESCRIPTION

This course is a continuation of the study of the fundamental principles of chemistry with an emphasis physical chemistry. Topics of study include chemical equilibrium, acid/base chemistry, chemical kinetics, nuclear chemistry, thermodynamics and electrochemistry. The course also includes some descriptive chemistry of a selection of main group elements and transition metals. The mandatory laboratory component of the course will illustrate and reinforce most of the topics presented in the lectures. Successful completion of this course and its companion CHEM 110 will satisfy the requirement for 6 credits of first year chemistry in the science and engineering degree programs at most Canadian and US universities.

LEARNING OUTCOMES

Upon successful completion of this course, students will:

- be able to understand and apply fundamental chemistry concepts.
- have developed critical thinking skills.
- have developed basic laboratory skills.

COURSE FORMAT (3-3-1)

Lectures: Three hours per week.

Labs: Three hours per week.

Students are required to attend all labs unless excused by the instructor for valid reasons. More than one unexcused absence from a lab will normally result in a failing grade for the lab and for the course.

Tutorials: One hour per week, incorporated into the lecture times.

The focus in the tutorials is on solving problems and reviewing assigned study materials and problems. The instructor will be available for additional assistance on an individual basis. Tutorial time will be blended into the lectures in order to coordinate examples with the lecture material.

COURSE PREREQUISITES and CO-REQUISITES

Chemistry 110, or Chemistry 12 (at least 70%) and Mathematics 12, or permission of the instructor

Students are expected to come to this course with an understanding of the topics covered in Chemistry 110 as many of these basic concepts will serve as the foundation for this course.

COURSE REQUIREMENTS/EVALUATION

Term test 1 (60 minutes)	15%
Term test 2 (60 minutes)	15%
Assignments	10%
Exam (3 hours)	30%
Laboratory	<u>30%</u>
Total	100%

Students must get at least 50% in both the laboratory and the lecture component in order to pass the course.

Attendance

Regular attendance is necessary in order to succeed in this course.

Assignments

There will be approximately 8-10 assignments. Assignments will involve a number of questions or problems related to the course material. These will be made available at least one week in advance of the due date. Any assignment handed in after the specified time will have 10% of the total value deducted from the mark. Every 24 hours after the due date/time will result in another 10% being deducted, except for weekends (Saturday & Sunday) which will count as a single day. Late assignments will not be accepted (receiving a mark of 0) once graded assignments have been returned to the class.

Tests and Examinations

There will be two 60-minute term tests (February 9, 2012) and March 15, 2012) held during scheduled class time. Please note that after the term tests the remaining class time will be used for a lesson. The final examination will take place during Final Exam period (April 16 – 27, 2012). The exam date will be announced as soon as it is known. Please note: discretionary travel is not a valid excuse to miss the final exam!

Laboratory component

The labs are a mandatory component of the course. Unauthorized absence from a lab will result in a mark of zero for that lab. Two unauthorized absences from labs will normally result in a failing grade for the lab component and a grade of F for the course. Expectations for the labs are outlined in the lab manual.

Plagiarism

Plagiarism involves representing the words of someone else as your own, without citing the source from which the material is taken. If the words of others are directly quoted or paraphrased, they must be documented according to standard procedures. The resubmission of a paper for which you have previously received credit is also considered an academic offence.

Plagiarism (academic dishonesty) is a serious academic offence and will result in you receiving a mark of zero (F) on the assignment or the course. In certain cases, it can also result in dismissal from the college. And do not underestimate the impact such a situation will have on your reputation.

STUDENTS WITH DISABILITIES OR CHRONIC CONDITIONS

Reasonable accommodations are available for students with a documented disability or chronic condition. It is the student's responsibility to seek these accommodations. If a student has a disability or chronic condition and may need accommodation to fully participate in this class, he/she should contact the learning Assistance Centre (LAC) at (867)668-8785 or lassist@yukoncollege.yk.ca.

REQUIRED TEXTBOOK(S)

Chemistry 8th edition by Zumdahl & Zumdahl– required
Study Guide for Zumdahl & Zumdahl's Chemistry by Paul Kelter is an optional text

Laboratory Manual for Chemistry 111 (will be provided)

A number of books (normally titled 'General Chemistry' or 'Chemistry') are available in the library for alternative explanations of the course material.

EQUIVALENCY/TRANSFERABILITY

Course transfer as of January 2012:

UBC	With CHEM 110 = CHEM 111 (4) + CHEM 113 (4)
UBCO	With CHEM 110 = CHEM 111 (3) + CHEM 113 (3)
UVIC	With CHEM 110 = CHEM 101 (1.5 units) + CHEM 102 (1.5 units)
UNBC	CHEM 101 (3) + CHEM 121 (1)
SFU	CHEM 122 (2) – Q + CHEM 126 (1) - Q
TRU	CHEM 1200 (3)
UAF	CHEM 106X (3)
UAS	CHEM 106 (3)
UR	CHEM 102 (3)

On the strength of these transfer agreements the course will likely transfer to many other universities with which we do not maintain formal transfer agreements. For more information about transferability contact the Applied Science office.

See the website <http://bctransferguide.ca/> for a more complete list of transfers within British Columbia, including to university colleges.

SYLLABUS

Week	Chapter	Topic
1/2	13	Chemical Equilibrium – equilibrium condition, equilibrium constant, applications, Le Chatelier's Principle
2/3	14	Acids & Bases – definitions, strength, pH, polyprotic acids, ionic acids and bases, Lewis acids and bases
4	15	Acid/Base Equilibria – common ion, buffers, titrations and pH curves, indicators
5/6	16	Solubility and Complex Ion Equilibria – solubility products, qualitative analysis, complex ions
7	12	Chemical Kinetics – rates, rate laws, reaction mechanism, catalysis
8	6 8	Thermochemistry – energy, enthalpy, Hess' Law enthalpies, energy sources Bond energies
9/10	17	Spontaneity, Entropy and Free Energy – spontaneous processes, 2 nd law of thermodynamics, entropy changes in reaction, free energy and reactions, free energy and equilibrium
10/11	18 4	Electrochemistry – balancing redox reactions, galvanic cells, standard reduction potentials, cell potential, applications
12	20	Descriptive main group chemistry
13	19	The nucleus – nuclear stability and radioactive decay, half-life, transformations, detection and uses, fission, fusion

IMPORTANT DATES

January 10, 2012	First class
February 9, 2012	Term Test 1
February 23, 2012	Last day to withdraw without academic penalty
February 24, 2012	Heritage Day (no labs)
March 5 - 9, 2012	Reading week (no classes and labs)
March 15, 2012	Term Test 2
April 6, 2012	Good Friday (no labs)
April 9, 2012	Easter Monday (no labs)
April 13, 2012	Last day of classes
April 16 - 27	Examination period