

Division of Applied Science & Management
CHEM 111
Credit Course
Winter, 2015

CHEM 111 CHEMICAL ENERGETICS AND DYNAMICS

INSTRUCTOR: Ernie Prokopchuk, PhD

OFFICE HOURS: Friday 9:00 am – noon
**Open door policy is in effect*

OFFICE LOCATION: A2513

CLASSROOM: A2603

E-MAIL: eprokopchuk@yukoncollege.yk.ca

TIME: Tues & Thurs 10:00 – 11:59 (class)
Mondays 1:00 – 4:00 (lab)

TELEPHONE: (867) 668-8865

DATES: January 6 – April 23, 2015

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.

PREREQUISITES

Chemistry 110, or both Chemistry 12 (with a recommended grade of 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.

EQUIVALENCY OR TRANSFERABILITY

Course transfer as of December 2014:

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.

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.

DELIVERY METHODS

Classes are a blend of lecture and tutorial allowing for an opportunity to practice solving calculation-based problems related to the material being covered in class.

Classes will be recorded with the intent to provide students with a way to revisit material covered in class. This may be helpful while studying or to review a topic covered in class. This will provide greater flexibility to students who are unable to make classes due to work commitments (or any other reason for absence that comes up).

Links to these videos will be posted online but the videos will only be viewable by people with the password which will only be provided to students enrolled in the class. Portions of the videos may be used for professional development purposes, meaning that they may be shown to staff and faculty within the College for the purposes of workshops and demonstrations, and possibly to instructors outside of the College as part of a conference presentation.

Most students in the class will not be visible on the videos, but voices may be heard during class discussions. Seats that are visible will be indicated on the first day of class.

Material is regularly posted on the course LMS accessible through MyYC. This material will include links to lecture capture videos, assignments, course announcements, suggested textbook problems, an exact copy of everything written on the screen during class, and other useful or interesting material related to the course.

Labs are a mandatory component of the course. In order to receive a passing grade in the lab, a student must complete the experiments and submit the required reports. If a lab period is missed, the report for that experiment cannot be submitted unless arrangements are made with the instructor. Expectations for the labs are outlined in the lab manual.

COURSE FORMAT

Lectures: Three hours per week.

Labs: Three hours per week.

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

COURSE REQUIREMENTS

There are no other requirements beyond the listed prerequisites, corequisites, and assessment criteria.

ASSESSMENTS

Attendance

While attendance is not graded, it is strongly recommended. There is usually a strong correlation between regular attendance and academic performance.

Assignments

There will be at least 8 assignments due on an approximately weekly basis. Assignments as a whole are worth 10% of the final grade which is determined based on the total mark obtained on all assignments. Assignments will involve a number of questions or problems related to the course material. You will have at least one week to complete each assignment. Late assignments will be penalized 10% for each day late. Late assignments will not be accepted (receiving a mark of 0) once graded assignments have been returned to the class, which usually happens at the next class.

Tests and Examinations

There will be two 60-minute term tests (February 5 and March 5, 2015) held during scheduled class time. Each test is worth 15% of the final grade. Please note that after the term tests the remaining class time will be used for a lesson. The final examination, worth 30% of the final grade, will take place during Final Exam period (April 13 – April 24). The exam date will be announced as soon as it is known.

Laboratory component

As a whole, the laboratory component is worth 30% of the final grade. This will be based on lab performance (10%), pre-lab questions (10%), and lab reports (80%) The specific evaluation criteria for the lab are detailed in the lab manual.

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

REQUIRED TEXTBOOKS AND MATERIALS

Olmsted J, Williams G, Burk RC. 2013. Chemistry. 2nd Canadian ed. Mississauga (ON): John Wiley & Sons Canada, Ltd.

The textbook will be available in the bookstore in a “binder-ready” format bundled with the student solutions manual.

Laboratory Manual for Chemistry 111 (available at the first lab session)

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person’s writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

TOPIC OUTLINE

Week	Chapter	Topic
1, 2	14	Chemical Equilibria – equilibrium condition, equilibrium constant, applications, Le Chatelier's Principle
2, 3	15	Acid-Base Equilibria – definitions, strength, pH, polyprotic acids, ionic acids and bases, Lewis acids and bases
3 – 6	16	Applications of Aqueous Equilibria – buffers, titrations and pH curves, solubility, complexation
6 - 8	13	Chemical Kinetics – rates, rate laws, reaction mechanism, catalysis
8, 9	3 6 8	Thermochemistry – energy, thermodynamics, enthalpy, Hess' Law enthalpies, energy sources Bond energy Phase changes
10, 11	12 14	Spontaneity, Entropy and Free Energy – spontaneous processes, 2 nd law of thermodynamics, entropy changes in reaction, free energy and reactions Thermodynamics and equilibrium
11, 12	17	Electron-transfer Reactions – balancing redox reactions, galvanic cells, standard reduction potentials, cell potential, applications
13	20	Descriptive main group chemistry

**Specific dates of topic coverage may be subject to change. Some topics may not be covered depending on time constraints.*