Chemistry 0010 Course Outline
Introductory Chemistry
Summer Evening 2015

Instructor: Dr. C. Booker

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Office Hours: Thursday 5 pm – 6 pm, Beryl Ivey Library

Course Description
Chemistry 0010 is equivalent to the Ontario Grade 12U level chemistry. Some topics from Grade 11U are covered briefly. Topics to be studied include; atomic theory, molecular structure, types of chemical reactions and stoichiometry, thermochemistry, kinetics, equilibrium, oxidation and reduction reactions and organic chemistry. Laboratory work will be an important component of this course.

Course Times
Lectures: Tuesdays and Thursdays 6:30 – 9:30 pm, St. James Room 201
Laboratories/Tutorials: Wednesdays 6:30 – 9:30 pm, MRW 156

Detailed Schedule for lectures, tutorials, labs and midterms will be handed out in class.

Required Materials
All are available at the Western Bookstore:
Chemistry 0010 Notes Summer 2015
Chemistry 0010 Lab Manual Summer 2015
Lab Coat and scientific calculator

Course Evaluation

Lab Reports (7 + Introductory Lab)	15 %
Quizzes (11)	15 %
Midterm Test #1 (Wed. June 3)	20 %
Midterm Test #2 (Tues. June 30)	20 %
Final Exam (Scheduled by the Registrar)	30 %

You must pass the laboratory portion of the course to pass the course (mark ≥ 7.5 / 15).

All the labs and all the quizzes count toward the mark. None are 'dropped'.

Laboratory Requirements

A lab coat is mandatory and may be purchased at the Western bookstore. Safety Glasses will be provided.

Dress Code: A lab coat, long pants (must come to the ankles), socks that cover the ankles, and closed shoes are mandatory, hair must be tied back, if possible. Students will be asked to leave the lab if these requirements are not met and a mark of zero will be assigned for that lab.

Attendance: All labs count toward the lab mark. ***Any student who is more than 5 minutes late will not be permitted to do the experiment.*** The clock in the lab will be used as the basis for this decision. Please contact academic counseling if you miss a lab due to illness or other extenuating circumstances.

Objectives: At the completion of the course, the student should be able to: correctly use lab equipment such as burettes, balances and pipettes; titrate a solution to the endpoint; follow written instructions; record pertinent observations; use experimental data to complete calculations using the correct number of significant figures; compare their data to 'real' data and make constructive suggestions as to why there may be differences.

Tutorials

Tutorials will be held on the Wednesdays when labs are not scheduled. This is an opportunity to review content, ask questions, and work through practice problems. Lectures will also be an opportunity to ask questions and work through practice problems.

Quizzes

Quizzes will be posted online on an (almost) weekly basis to a total of 11. These are open book quizzes, but must be **completed individually**. Quizzes will be accessible through the OWL course website from Friday to **Tuesday at 6 pm** each week. Quizzes can be completed at any point during this time frame, and students will have 1 h to complete the quiz once it has begun.

Communication

Students will receive email at their UWO address only. Schedules and important information will be posted on the OWL website. Please check for email and website updates on a regular basis.

Absences

Absence from any activity that is marked (labs and midterms) must be dealt with by academic counseling. Documentation will be required.

Department Policy: For academic accommodation to be considered for any course component worth less than 10% of the final course grade, it is the responsibility of the student to approach the course instructor(s) in a timely fashion. Documentation may be required to be submitted to the academic advisor. If documentation is required, the request for accommodation will be decided by the academic advisor in consultation with the instructor. If documentation is not required, the instructor will make the final decision. The policies governing requests for academic accommodation for course components worth 10% or more of the course grade are outlined in the Academic Policies section included at the end of the course outline.

Late Assignments

Lab reports are marked out 10. Any that are handed in late will have *one mark per day deducted* and will not be accepted once the marked reports have been returned to the other students, unless documentation is received from academic counselling. Lab reports are usually due on the Thursday following the Wednesday lab period. These will be marked and returned to the students at the next class (Tuesday).

Code of Conduct

All classes will start promptly. Please bring the course notes and a calculator to class. It is expected that you will come to class prepared to listen, participate and ask questions.

Some Suggestions

If you are having trouble with any of the concepts, contact the instructor and ask for help as soon as possible. Attendance is strongly correlated to the mark achieved in this course. Math skills are also quite important. An assessment will be given to evaluate your math skills and does not count toward the course mark.

This is a problem solving course. There are lots of examples for you to follow in the Course Notes. However, it is very difficult to do well in this course without **doing the problems on your own**. There are lots of questions in the Course Notes. The final answers to most of the questions are given in the course notes and the **full solutions are on course website**. Do not just read the solutions. Do as many as you need to grasp the concept. Practice exams will be provided. Chemistry textbooks will be available in the library as reference. This course has a heavy workload and it can be difficult to catch up once you fall behind.

Topics and Objectives

The *objectives* listed with each topic will not cover every type of question that will be asked.
For each topic the student should be able to:

Chemistry: the Study of Matter

- identify the major parts of an atom; distinguish between chemical and physical properties; name simple compounds

The Mole

- solve calculations involving Avogadro's number, moles, molar mass, molarity, and the composition of compounds or mixtures

Chemical Reactions and Stoichiometry

- write and balance specific types of reactions and carry out calculations, using stoichiometry, involving amounts of products made and reactants used; determine oxidation states, solubility, and pH; determine the limiting reagent and yield

Atomic Theory

- describe the historical development of the structure of the atom and arrangement of the electrons; use conventional methods to describe the arrangement of the electrons in atoms and ions (electron configuration, orbital box notation, quantum numbers)

Periodic Properties

- use core charge and the distance of an electron from the nucleus to explain the trends in the periodic table with respect to atomic size, ionization energy, electron affinity and electronegativity

Structures and Bonding

- describe the types of bonding that occurs between elements from different parts of the periodic table: metallic, ionic and covalent

Lewis Structures

- apply the rules for Lewis structures to draw molecules with covalent bonds and determine some features of the compound such as resonance and bond order

VSEPR Rules for Molecular Shapes

- apply the VSEPR theory rules to determine the shape of a compound at a central atom, the hybridization of the central atom and the polarity of the compound

Intermolecular forces

- determine the type and relative strength of the forces that exist between molecules based on their structure

Ideal Gases

- use the Ideal gas law to carry out calculations involving one gas or a mixture of non-reacting gases; identify the forces that account for differences between an ideal and real gas

Thermodynamics

- calculate the energy changes involved in various processes such as heating, cooling, changes of state and chemical reactions; distinguish between energy change and enthalpy change; use Hess's Law to determine the enthalpy change for a reaction; write formation reactions; use calorimetry to determine the heat of a reaction; describe entropy and Gibb's Free Energy

Kinetics

- use stoichiometry to describe the relationship between the rates of reaction of the various components of a reaction; use Collision Theory to explain the factors affecting the rate of a reaction; given the appropriate information determine the rate law for a specific reaction; identify the order of a reaction, the intermediates and any catalysts; calculate the half life time or concentrations involved in first order reactions; carry out calculations using the Arrhenius equation

Chemical Equilibrium

- write the equilibrium constant expression for a given reaction and carry out simple calculations; use Le Chatelier's Principle or the reaction quotient to determine the direction in which a reaction will proceed; use various strategies to simplify calculations involving equilibrium constants; write the equilibrium reaction and carry out calculations for equilibrium situations involving low soluble salts, weak acids, weak bases, salts or buffer solutions; identify various titration curves, choose an appropriate indicator for a titration

Redox Reactions

- determine the oxidation state of an element; balance a redox reaction and identify the species being oxidized or reduced

Electrochemistry

- identify the parts of an electrochemical cell; write cell notations; use the cell potential to determine the spontaneity of the reaction; use Faraday's Law to calculate various parameters such as current, time or the amount of product in an electrolytic process

Organic Chemistry

- identify various organic functional and family groups; name simple compounds; identify conformers, structural isomers and geometric isomers; describe properties relative to other family groups; identify several common types of organic reactions, draw/name the product of the reactions of several types of organic compounds

Polymers

- identify the two types of reactions used to make polymers; given the starting materials draw the polymer that could be made, identify the common polymers

BRESCIA UNIVERSITY COLLEGE ACADEMIC POLICIES AND REGULATIONS

1. POLICY REGARDING MAKEUP EXAMS AND EXTENSIONS OF DEADLINES

When a student requests academic accommodation (e.g., extension of a deadline, a makeup exam) for work representing 10% or more of the student's overall grade in the course, it is the responsibility of the student to provide acceptable documentation to support a medical or compassionate claim. All such requests for academic accommodation **must** be made through an Academic Advisor and include supporting documentation. Academic accommodation on medical grounds will be granted only if the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete her academic responsibilities. Appropriate academic accommodation will be determined by the Dean's Office in consultation with the student's instructor(s). Please note that personal commitments (e.g., vacation flight bookings, work schedule) which conflict with a scheduled test, exam or course requirement are not grounds for academic accommodation.

A UWO Student Medical Certificate (SMC) is **required** if a student is seeking academic accommodation on medical grounds. This documentation should be obtained at the time of the initial consultation with the physician/nurse practitioner or walk-in clinic. A SMC can be downloaded under the Medical Documentation heading of the following website: https://studentservices.uwo.ca/secure/index.cfm . If it is not possible to have an SMC completed by the attending physician/nurse practitioner, the student must request documentation sufficient to demonstrate that her ability to meet academic responsibilities was seriously affected. Please note that under University Senate regulations documentation stating simply that the student "was seen for a medical reason" or "was ill" is **not** adequate to support a request for academic accommodation. All documentation is to be submitted to an Academic Advisor.

Whenever possible, requests for academic accommodation should be initiated in advance of due dates, examination dates, etc. Students must follow up with their professors and Academic Advisor in a timely manner.

The full statement of University policy regarding extensions of deadlines or makeup exams can be found at http://www.westerncalendar.uwo.ca/2014/pg117.html

2. ACADEMIC CONCERNS

If you feel that you have a medical or personal problem that is interfering with your work, contact your instructor and Academic Advisor as soon as possible. Problems may then be documented and possible arrangements to assist you can be discussed at the time of occurrence rather than on a retroactive basis.

Retroactive requests for academic accommodation on medical or compassionate grounds may not be considered.

If you think that you are too far behind to catch up or that your work load is not manageable, you should consult an Academic Advisor. If you consider reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines (refer to the Registrar's website, www.registrar.uwo.ca, for official dates). You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. Note that dropping a course may affect OSAP eligibility and/or Entrance Scholarship eligibility.

The Dean may refuse permission to write the final examination in a course if the student has failed to maintain satisfactory academic standing throughout the year or for too frequent absence from the class or laboratory.

3. **ABSENCES**

Short Absences: If you miss a class due to a minor illness or other problems, check your course outline for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate. Contact the course instructor if you have any questions.

Extended Absences: If you have an extended absence, you should contact the course instructor and an Academic Advisor. Your course instructor and Academic Advisor can discuss ways for you to catch up on missed work and arrange academic accommodations, if appropriate.

4. **POLICY ON CHEATING & ACADEMIC MISCONDUCT**

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf .

Students are responsible for understanding the nature of and avoiding the occurrence of plagiarism and other academic offences. Students are urged to read the section on Scholastic Offences in the Academic Calendar. Note that such offences include plagiarism, cheating on an examination, submitting false or fraudulent assignments or credentials, impersonating a candidate, or submitting for credit in any course without the knowledge and approval of the instructor to whom it is submitted, any academic work for which credit has previously been obtained or is being sought in another course in the University or elsewhere. Students are advised to consult the section on Academic Misconduct in the Western Academic Calendar.

If you are in doubt about whether what you are doing is inappropriate or not, consult your instructor, the Student Services Centre, or the Registrar. A claim that "you didn't know it was wrong" is not accepted as an excuse.

The penalties for a student guilty of a scholastic offence (including plagiarism) include refusal of a passing grade in the assignment, refusal of a passing grade in the course, suspension from the University, and expulsion from the University.

Plagiarism:

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where

appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com.

Computer-marked Tests/exams:

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. Software currently in use to score computer-marked multiple-choice tests and exams performs a similarity review as part of standard exam analysis.

5. PROCEDURES FOR APPEALING ACADEMIC EVALUATIONS

All appeals of a grade must be directed first to the course instructor. If the student is not satisfied with the decision of the course instructor, a written appeal signed by the student must be sent to the Department Chair. If the response of the department is considered unsatisfactory to the student, she may then submit a signed, written appeal to the Office of the Dean. Only after receiving a final decision from the Dean may a student appeal to the Senate Review Board Academic. A Guide to Appeals is available from the Ombudsperson's Office, or you can consult an Academic Advisor. Students are advised to consult the section on Academic Rights and Responsibilities in the Western Academic Calendar.

6. PREREQUISITES AND ANTIREQUISITES

Unless you have either the prerequisites for a course or written special permission from your Dean to enroll in it, you will be removed from the course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Similarly, you will also be deleted from a class list if you have previously taken an antirequisite course unless this has the approval of the Dean. These decisions may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course because you have taken an antirequisite course.

7. SUPPORT SERVICES

The Brescia University College Registrar's website, with a link to Academic Advisors, is at http://www.brescia.uwo.ca/academics/registrar_services/index.html . The Western Registrar's website is at http://www.registrar.uwo.ca/index.cfm . The website for the Student Development Centre at Western is at http://www.sdc.uwo.ca/. Students who are in emotional/mental distress should refer to Mental Health @ Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

Portions of this document were taken from the Academic Calendar, the Handbook of Academic and Scholarship Policy and the Academic Handbook of Senate Regulations. This document is a summary of relevant regulations and does not supersede the academic policies and regulations of the Senate of the University of Western Ontario.