



**Course Outline**

**UNIVERSITY STUDIES**

**CHEMISTRY 101A**  
Introductory University Chemistry I  
**Fall 2014**

**3 CREDITS**  
**4 hours lecture, 3 hours laboratory**

**INSTRUCTOR: DR. SORIN NITA**

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**PHONE NUMBER:** (780) 715-3924

**E-MAIL:** sorin.nita@keyano.ca

**OFFICE NUMBER:** S209F

**OFFICE HOURS:**

Monday	1:00 PM – 3:50 PM
Tuesday	1:00 PM – 1:50 PM
Wednesday	1:00 PM – 1:50 PM

**HOURS OF INSTRUCTION:**

Monday	4:00 PM – 4:50 PM	Room 273
Wednesday	8:00 AM – 8:50 AM	Room 273
Friday	10:00 AM – 11:50 AM	Room 273

**LABORATORIES:**

Tuesday	9:00 AM – 11:50 AM	Room 236	CHEM 101X
Tuesday	2:00 PM – 4:50 PM	Room 236	CHEM 101Y
Wednesday	9:00 AM – 11:50 AM	Room 236	CHEM 101Z

**COURSE DESCRIPTION:**

Atoms and molecules, states of matter, chemistry of the elements, relevance and uses of elements and compounds.

**PRE-REQUISITE(S):**

Chemistry 30 or equivalent

**COURSE OUTCOMES:**

The student will be able to:

- Perform chemical experiments using laboratory equipment, and apply safety procedures to ensure a safe working environment for oneself and co-workers
- Summarize various atomic models and explain the modern approach towards atomic structure (quantum mechanical atom)
- Describe electronic configurations and correlate the chemical properties of elements with their electronic structure
- Analyze chemical compounds using various chemical bonding theories and predict their molecular structure (VSEPR), hybridization (Valence Bond Theory) and electronic diagrams (Molecular Orbital Theory)
- Analyze acid-base and redox reactions, balance chemical equations, and perform stoichiometry calculations

**REQUIRED RESOURCES:**

1. **General Chemistry: Principles & Modern Applications**; Petrucci, Herring, Madura, Bissonnette; Pearson Canada Inc., Toronto, Ontario, 2011 (10<sup>th</sup> edition).  
*The 9<sup>th</sup> edition of this textbook is also acceptable.*
2. **Chemistry 101/102 Laboratory Manual**; Keyano College (2014/2015 edition).  
*The old editions of the lab manual are not acceptable.*
3. **Student Lab Notebook with Permanent Binding**; Plymouth, Michigan: Hayden-McNeil, LLC
4. A non-programmable scientific calculator (**Sharp EL-531**, used for exams, is recommended).
5. Extra long lab coat.

**TOPICS TO BE COVERED:****Please Note:**

This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

**1. ATOMIC STRUCTURE****textbook chapters**

Nature of light, atomic spectra, Bohr model of atom	8.1-8.4
Nature of matter, quantum mechanical model of atom	8.5-8.6
Shapes and energies of hydrogen orbitals, electron spin	8.7-8.11
Periodic table, trends in atomic properties (sizes, IE, EA), magnetic properties	8.12, 9.1-9.6
Periodic properties of elements	9.7

**2. CHEMICAL BONDING**

Lewis structures, polar bonds, electronegativity, formal charge vs. oxidation number	10.1-10.4
Resonance, octet rule exceptions	10.5-10.6
VSEPR and molecular structure	10.7-10.9
Valence bond theory, hybridization, multiple bonding	11.1-11.4
Molecular orbital theory, bonding in metals	11.5-11.7

**3. STATES OF MATTER**

Relation of gases, liquids, solids with intermolecular forces	12.1
Ideal gases, mixtures of gases, partial pressures, Dalton's law	6.1-6.6
Kinetic molecular theory, real gases	6.7-6.9
Properties of liquids and solids	12.2-12.3, 12.5-12.2
Phase diagrams	12.4

**4. CHEMISTRY OF THE ELEMENTS**

Principles: atomic properties, bonding, metal vs. nonmetals, acids and bases, redox, physical states 5.1-5.3

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Acids and bases

Definitions: Arrhenius, Brønsted-Lowry, Lewis 16.1-16.9

Nomenclature: binary acids, oxoanions, oxoacids, carboxylic acids, amines

Acid-base properties of salts; structure and strength

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Oxidizing and reducing agents 5.4-5.7

**LABORATORY EXPERIMENTS:**

Experiment 1 – Reactions of Copper – part 1

Experiment 2 – Reactions of Copper – part 2

Experiment 3 – Atoms and Line Spectra

Experiment 4 – Analysis of an Inorganic Salt for Water

Experiment 5 – Calorimetry

Experiment 6 – Quantitative Analysis for Cations

Experiment 7 – Experimental Determination of the Ideal Gas Constant

Experiment 8 – Standardization and Titration of Acid and Base Solutions

**MOODLE**

Go to <http://ilearn.keyano.ca>

This course is supported through Moodle. Assignments, readings and handouts will be posted on Moodle. Login information will be provided by your instructor. For further instructions please see the Moodle handout.

**EVALUATION:**

Assignment	Percentage	Due Date
Quizzes	10%	N/A
Laboratory*	25%	N/A
Midterm 1 Exam	6%	Monday, October 6 <sup>th</sup> , 2014
Midterm 2 Exam	14%	Friday, November 7 <sup>th</sup> , 2014
Final Exam	45%	<i>During the final examination period</i>

\*The laboratory component has eight weekly experiments, plus a laboratory examination at the end of the semester. Before each experiment the students need to prepare a prelab in which they summarize the experimental procedure and solve a few related problems. After the experiment is performed the students need to prepare a laboratory report in which they need to use the experimental data and do calculations.

**GRADING SYSTEM:**

Letter Grade	Description	Grade Points
A+		4
A	Excellent	4
A-		3.7
B+		3.3
B	Good	3
B-		2.7
C+		2.3
C	Satisfactory	2
C-		1.7
D+		1.3
D	Minimal Pass	1
F	Failure	0

**Students intending to transfer to other institutions require a ‘C-’ as a minimum grade.**

**Transfer information on each course is available at the [Alberta Council on Admission and Transfers](#).**

In the chemical laboratory, students **must** use a lab coat and a pair of safety goggles (if you normally wear contact lenses, you should switch to regular glasses for lab work). *You should never wear contact lenses in a lab.*

**Students who do not complete all the required work should not expect to pass the course.**

*Students should consult:*

<http://www.keyano.ca/Academics/Examinations>

**IMPORTANT DATES:**

September 16 <sup>th</sup> , 2014	Courses dropped after this date will be designated “W”. (A withdrawal (W) is not reflected in your GPA)
October 24 <sup>th</sup> , 2014	Courses dropped after this date will be designated “WF”. (A withdrawal failure (WF) counts as a 0 in your GPA)
December 5 <sup>th</sup> , 2014	Last day of classes
December 8 <sup>th</sup> -17 <sup>th</sup> , 2014	Final Exams

## COLLEGE POLICIES

### Equality, Equity and Respect

The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

*Students should consult:*

<http://www.keyano.ca/StudentLife/StudentConduct/IndividualRightsPolicy>

### Plagiarism and Cheating

Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

### Student Rights & Responsibilities

Students should consult the Keyano College Credit Calendar or online at:

<http://www.keyano.ca/Academics/CreditCalendar>

### Specialized Supports and Duty to Accommodate

*Disability Support Services: Learner Assistance Program*

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

*Specialized Supports and Duty to Accommodate*

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.



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**Dr. Sorin Nita, Instructor**

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**Date**

**Reviewed and approved by:**

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**Louis Dingley, Chair**

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**Date**

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**Guy Harmer, Dean**

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**Date**