

# School of Academic and Skill Development



CHEM 050  
Introduction to Chemistry I  
Fall 2021  
3 Credits

## Course Outline

<b>INSTRUCTOR</b>	Stephen Biggin-Pound	<b>OFFICE HOURS</b>	After class or by appointment
<b>OFFICE</b>	A2105	<b>CLASSROOM</b>	A2204
<b>E-MAIL</b>	sbigginpound@yukonu.ca	<b>CLASS TIME</b>	T, Th, F 10:30 – 11:50 AM
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### COURSE DESCRIPTION

This course introduces the basic principles of chemistry: matter and energy, measurement; atomic theory and the periodic table, chemical formulas and calculations, chemical bonding, liquids and solids, and solutions, molarities, stoichiometry, titration, and hydrocarbons. Includes eight laboratory sessions.

### COURSE REQUIREMENTS

**Pre-requisites:** High school Science 10 or YukonU Science 030 are recommended.

**Corequisite(s):** High school Math 11 with algebra, MATH 051, Math 050, or equivalent. It is recommended to complete these courses before CHEM 050.

### EQUIVALENCY OR TRANSFERABILITY

Yukon University CHEM 050 is articulated as Advanced Chemistry in the Adult Basic Education (ABE) system in British Columbia and the Yukon.

ABE Advanced Chemistry is equivalent to high school Chemistry 11.

Refer to the BC Adult Basic Education Articulation Handbook available here:

[https://www2.gov.bc.ca/assets/gov/education/post-secondary-education/adult-education/abe\\_guide.pdf](https://www2.gov.bc.ca/assets/gov/education/post-secondary-education/adult-education/abe_guide.pdf)

## LEARNING OUTCOMES

Upon successful completion of the course, students will be able to meet the competencies as stated for ABE Advanced Chemistry in the BC Articulation Handbook :

- obtain the prerequisite body of knowledge and skills that will provide a basis for further academic and career/vocational training
- apply the scientific method to investigations of all phenomena
- communicate effectively, particularly to the scientific community using the language of chemistry
- carry out all duties in an ethical, professional manner, including the collection of data
- handle equipment and chemicals in a safe and effective manner with regard to their own safety and the safety of others

## COURSE FORMAT

### Delivery format

This course and the lab are delivered with set meeting times in-person on campus (synchronous face-to-face). A hybrid format, delivered both in-person on campus and by Zoom may be available on request for distance students.

### Workload

Students are expected to attend 1.5 hr lectures 3 times per week, for a total of approximately 63 hrs. Homework and assignments are completed outside of class time, and it is expected these will require an additional 3-4 hrs of work per week. It is important to note that the time required for successful course completion will vary by individual.

The 8 mandatory laboratory sessions will occur about every other week for at least 2.5 hrs each. Lab reports will require an additional 1-2 hrs to complete.

## EVALUATION

### Engagement and Participation

Regular attendance and engagement, including completing homework and assignments, will provide the best opportunity for success in the course.

Laboratories include carrying out experiments and the collection of data required to submit results and a written report; therefore, students must attend the labs. Missed labs will not be repeated. Students arriving late to lab sessions may be refused entry for safety and disruption purposes.

### Assignments

Short, question-based assignments will be assigned for each chapter covered in the course. Assignments account for 20% of the course mark.

## Quizzes and Tests

There are two midterm exams in the course. Each midterm accounts for 25% of the course mark (50% total).

## Laboratories

There are 8 labs in the course, most of which require the submission of results and a detailed lab report. The labs account for 30% of the course mark. *Students must achieve a minimum of 50% on the laboratory component of the course in order to pass the course.*

## Summary

Assignments	20 %
Midterm 1	25 %
Midterm 2	25 %
Laboratories	30 %
<b>Total</b>	<b>100%</b>

## TEXTBOOKS & LEARNING MATERIALS

Zumdahl, S. 2004. Introductory Chemistry: A Foundation (5<sup>th</sup> ed.)

- on reserve at the YukonU Library for full-term loan. You *must return the textbook* or face a hold on your account preventing you from accessing transcripts or registering for further courses.

Yukon University Chemistry 050 Laboratory Manual

- supplied as a PDF on moodle, and printed copies available.

Scientific calculator

## COURSE WITHDRAWAL INFORMATION

Students may officially withdraw from a course or program without academic penalty up until two-thirds of the course contact hours have been completed. The last day to withdraw without academic penalty is November 5<sup>th</sup>, 2021. See withdrawal information at [www.yukonu.ca/admissions/money-matters](http://www.yukonu.ca/admissions/money-matters)

Refer to the YukonU website for important dates: [www.yukonu.ca/admissions/important-dates](http://www.yukonu.ca/admissions/important-dates)

Refunds may be available. See the Refund policy and procedures at [www.yukonu.ca/admissions/money-matters](http://www.yukonu.ca/admissions/money-matters)

## ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic

assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures (updated bi-annually) for further details about academic standing, and student rights and responsibilities: [www.yukonu.ca/policies/academic-regulations](http://www.yukonu.ca/policies/academic-regulations)

## 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 University Academic Regulations (available on the Yukon University website at [www.yukonu.ca/policies/academic-regulations](http://www.yukonu.ca/policies/academic-regulations))

It is the student's responsibility to seek these accommodations by contacting the Learning Assistance Centre (LAC): [LearningAssistanceCentre@yukonu.ca](mailto:LearningAssistanceCentre@yukonu.ca).

## TOPIC OUTLINE

Chemistry 050 covers the Core Topics as stated for ABE Advanced Level Chemistry located in the BC Adult Basic Education Articulation Handbook which may be found at <http://www.bctransferguide.ca/>

### A. Measurement

- Demonstrate the concepts of precision and accuracy and how they differ, utilizing significant figures
- Perform calculations using scientific notation
- Perform conversions with the SI system

### B. Properties of Substances

- Differentiate between the phases of matter
- Identify chemical or physical properties of substances
- Describe Dalton's Atomic Theory and the Law of Constant Composition

### C. Periodic Trends

- Use the periodic table to determine atomic composition of isotopes
- Use the periodic table to predict electron arrangement of chemical families in order to predict trends in ion charge, reactivity, ionization energy, electronegativity, atomic radii, and ionic radii

### D. Atomic Structure

- Analyze the historical development of atomic theory
- Describe the Bohr and Wave Mechanical model of the atom and cite evidence for these models including absorption and emission spectra and their use in modern technology

### E. Mole Concept

- Define a mole and its significance
- Perform calculations including molar and formula mass, mole to mass conversions, and percent

[www.yukonu.ca](http://www.yukonu.ca)

- composition by mass of compounds

#### F. Bonding

- Define covalent and ionic bonding
- Construct the formulas of compounds
- Use electronegativity to predict bond types
- Draw Lewis structures, predict molecular shapes, and determine polarity

#### G. Nomenclature

- Write names for compounds given the formulae and write formulae for compounds given the names for the following types of compounds:
  - Covalent compounds
  - Ionic compounds
  - Compounds containing polyatomic ions
  - Compounds containing transition metals
  - Acids

#### H. Chemical Reactions

- Balance equations
- Classify and predict single and double replacement reactions, combustion reactions, and acid-base neutralizations
- Classify synthesis, decomposition, exothermic and endothermic reactions Perform stoichiometric calculations including mass-to-mass, limiting reagent, and percent yield

#### I. Solutions

- Predict solubility and conductivity of polar and non-polar compounds
- Define Arrhenius acids and bases
- Relate the pH scale to acids and bases
- Perform calculations involving dilutions
- Perform stoichiometric calculations involving solutions including titrations

#### J. Organic Chemistry

- Classify substances as organic
- Differentiate the various types of bonding between carbon atoms
- Write names and draw structures of hydrocarbons
- Categorize organic compounds based on their functional groups