School of Academic & Skill Development

CHEM 060

Introduction to Chemistry 060

Term: Winter 2025

3 Credits

Course Outline

INSTRUCTOR	David Heilig, PhD	**OFFICE HOURS**	By appointment
OFFICE	-	**CLASSROOM**	Lecture: A2204 Laboratory: A2803
E-MAIL	david.heilig@yukonu.ca	**CLASS TIME**	Lecture: - Mon 10:30 – 11:50 AM - Wed 10:30 – 11:50 AM Laboratory: - Fri 01:00 – 03:50 PM
PHONE	(867) 336 3535	**CRN**	20140/20141

COURSE DESCRIPTION

This course covers structure of molecules, introduction to organic chemistry, the gaseous state, reactions in water ionic equations, oxidation-reduction equations, acids and bases, and chemical equilibrium and kinetics. Includes eight laboratory sessions.

COURSE REQUIREMENTS

Prerequisite(s): Minimum grade of B- in CHEM 050 or equivalent.
*Students must also register in the mandatory lab component of the course, CHEM 060L

EQUIVALENCY OR TRANSFERABILITY

Find course transfer at https://www.bctransferguide.ca/

Students are reminded that it is always the receiving institution that determines whether a course is acceptable as an applicable, equivalent course or if it may be transferred to their program for credit. Find further information at: https://www.yukonu.ca/admissions/transfer-credit

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Obtain the prerequisite body of knowledge and skills that will provide a basis for further academic and career/vocational training.
- Appreciate and apply the chemistry of everyday life.
- Appreciate and 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.
- Work effectively as a member of a team.
- 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 twice a week, for a total of approximately 42 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 is a midterm and cumulative final examination. The examinations are "closed book" though data sheets will be provided.

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

Laboratories	30 %
Assignments	20 %
Mid-term	20 %
Final exam	30 %
Total	**100%**

TEXTBOOKS & LEARNING MATERIALS

Zumdahl, S. 2004. Introductory Chemistry: A Foundation (5th 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.

McBee, Tom. (2020). Yukon University Chemistry 060 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. Last day to withdraw or change to audit from winter term academic courses without academic penalty is Thursday, Mar 13 2025.

See withdrawal information at www.yukonu.ca/admissions/money-matters

Refer to the YukonU website for important dates: www.yukonu.ca/admissions/important-dates

Refunds may be available. See the Refund policy and procedures at 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

ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact Accessibility Services for resources or to arrange academic accommodations: access@yukonu.ca. [Text updated 16 November 2022]

TOPIC OUTLINE

Lecture Schedule

Week	Date	Lecture	Lecture topics	Recommended readings
1	Jan. 06	1	Carbon bonding and Alkanes	CH. 19.01 - 19.02
	Jan. 08	2	Structural formulas, Isomerism and Nomenclature of Alkanes	CH. 19.03 - 19.04
2	Jan. 13	3	Petroleum and Reactions of Alkanes	CH. 19.05 - 19.06
	Jan. 15	4	Alkenes and Alkynes, Aromatic Hydrocarbons and Naming Aromatic Compounds	CH. 19.07 - 19.09
3	Jan. 20	5	Functional groups, Alcohols, Aldehydes and Ketones	CH. 19.10 - 19.14
	Jan. 22	6	Carboxylic Acids, Esters and Polymers	CH. 19.15 - 19.16
4	Jan. 27	7	Proteins, Primary, Secondary, Tertiary Structure of proteins, and Function of Proteins	CH. 20.01 - 20.05
	Jan. 29	8	Enzymes, Carbohydrates, Nucleic acids and Lipids	CH. 20.06 - 20.09
5	Feb. 03	9	Pressure, Volume, Temperature, Moles and Related Laws	CH. 12.01 - 12.04
	Feb. 05	10	The Ideal Gas Law and Dalton's Law of Partial Pressures	CH. 12.05 - 12.06
6	Feb. 10	11	Laws and Models, Kinetic Molecular Theory of Gases and Gas Stoichiometry	CH. 12.07 - 12.10
	Feb. 12	-	*Mid-term Exam Review*	-
7	*Feb. 17*	-	*Reading Week (no classes)*	-
	Feb. 19	-	*Reading Week (no classes)*	-

Week	Date	Lecture	Lecture topics	Recommended readings
8	***Feb. 24***	**-**	***Mid-term Exam (in class)***	**-**
	Feb. 26	12	Acids and Bases and Acid Strength	CH. 15.01 - 15.02
9	Mar. 02	13	Water as an Acid and a Base	CH. 15.03
	Mar. 04	14	The pH Scale, Calculating the pH of Strong Acid Solutions and Buffered Solutions	CH. 15.04 - 15.06
10	Mar. 09	15	Chemical Reactions and Reaction Rates	CH. 16.01 - 16.02
	Mar. 11	16	Chemical Equilibrium Condition and Chemical Equilibrium	CH. 16.03 - 16.04
11	Mar. 16	17	Chemical Equilibrium and Equilibrium Constant	CH. 16.04 - 16.05
	Mar. 18	18	Heterogenous Equilibria and La Chatelier's Principle	CH. 16.06 - 16.07
12	Mar. 23	19	Applications Involving the Equilibrium Constant and Solubility Equilibria	CH. 16.08 - 16.09
	Mar. 25	20	Oxidation-Reduction Reactions and Oxidation States	CH. 17.01 - 17.02
13	Mar. 30	21	Oxidation-Reduction Reactions Between Nonmetals and Half-Reaction Method	CH. 17.01 - 17.02
	Apr. 01	22	Electrochemistry and Batteries	CH. 17.05 - 17.06
14	Apr. 06	23	Corrosion and Electrolysis	CH. 17.07 - 17.08
	Apr. 08	-	*Final Exam Review*	-

Dates of topics may change. Some of the topics might not be covered due to time constrains.

Laboratory Schedule

Week	Date	Lab	Lab experiment
1	Jan. 10	-	Laboratory Safety and Skills
2	Jan. 17	1	Spectral Analysis of Copper
3	Jan. 24	2	Preparation and Isolation of Esters
4	Jan. 31	-	-
5	Feb. 07	3	Preparation and Properties of Soap
6	Feb. 14	4	Qualitative Analysis
7	Feb. 21	-	*Reading Week (no classes)*
8	Feb. 28	5	Activation Energy
9	Mar. 06	6	Equilibrium
10	Mar. 13	-	-
11	Mar. 20	7	Electrochemical Cells
12	Mar. 27	8	Electrolytic Cells
13	Apr. 03	-	-
14	Apr. 10	-	-

Lab Schedule subject to change at Instructor's discretion.