Bow Valley College

Course Outline

CHEM1901

General Chemistry:
Structure and Bonding
Fall 2024 - Current

Last Updated: 8/13/2024 4:34:17 PM

CHEM1901 General Chemistry: Structure and Bonding

COURSE DESCRIPTION

An introduction to university chemistry from theoretical and practical perspectives, that focuses on an exploration of the fundamental links between electronic structure, chemical bonding, molecular structure and the interactions of molecules using inorganic and organic examples.

REQUISITES	None
EQUIVALENTS	None
CREDITS	4
HOURS	60
ELIGIBLE FOR PLAR	No
ZERO TEXTBOOK COST	Yes

COURSE LEARNING OUTCOMES

Bow Valley College is committed to ensuring our graduates can demonstrate their abilities in key areas that will make them effective citizens and encourage their development as lifelong learners. In addition to the discipline-specific skills that learners acquire in their programs, the College has identified ten learning outcomes.

College-Wide Outcomes:

1. Communication
2. Thinking Skills
3. Numeracy and Financial Literacy
4. Working with Others
5. Digital Literacy
6. Positive Attitudes and Behaviours
7. Continuous Learning
8. Health and Wellness Awareness
9. Citizenship and Intercultural Competence
10. Environmental Sustainability

#	COURSE LEARNING OUTCOME(S)	COLLEGE WIDE OUTCOMES SUPPORTED
1	Apply valence bond theory and molecular orbital theory to: (1) describe the energy and spatial distribution of electrons; (2) to correlate the physical properties of atoms with the way atoms interact.	2, 5, 7
2	Generate Lewis structures, VSEPR structures, and resonance structures.	2, 5, 7
3	Determine the approximate bond angles relative to the central atom.	2, 3, 5, 7
4	Distinguish bond polarities and identify the intermolecular forces present within chemical species.	2, 3, 5, 7
5	Explain or predict relative boiling points and viscosities using intra-molecular forces.	2, 5, 7
6	Use curly arrows and arrow pushing to explain the movement of electron(s) within or between structures.	2, 5, 7
7	Collect experimental data and analyze observations related to chemical activities.	1, 2, 3, 4

COURSE MODULES AND SCHEDULE

**Course schedule subject to change, depending on delivery mode and term of study. For exact dates, please consult the Course Offering Information in Brightspace.*

WEEK/HOURS	MODULES
Week 1	Electromagnetic energy/The Bohr model
Week 2	Development of quantum theory
Week 3	Electronic configurations
Week 4	Periodic properties
Week 5	Ionic and covalent bonding
Week 6	Lewis symbols and structures
Week 7	Curly arrows and arrow pushing
Week 8	Resonance/arrow pushing in reaction mechanisms
Week 9	VSEPR theory
Week 10	Isomers/molecular polarity and dipole moment
Week 12	Valence bond theory/hybrid atomic orbitals
Week 13	Molecular orbital theory/molecular orbital diagrams, bond order, and number of unpaired electrons
Week 14	Intermolecular forces/properties of liquids

ASSESSMENT

COURSE LEARNING OUTCOME(S)	ASSESSMENT	WEIGHT
1, 2, 3, 4, 5, 6, 7	Laboratory Component	25 %
1, 2, 3, 4, 5, 6, 7	Learning Activities	10 %
1, 2	Midterm Exam 1	15 %
3, 4	Midterm Exam 2	15 %
1, 2, 3, 4, 5, 6, 7	Final Exam	35 %

Important: For details on each assignment and exam, please see the Course Offering Information.

PERFORMANCE STANDARDS

A minimum grade of D is required to pass this course. However, a program may require a higher grade in this course to progress in the program or to meet specific program completion requirements.

- Lab reports/worksheets – there will be 15 hours of lab time through the semester (5 sessions X 3 hours)
- A mark of less than 50% in the laboratory component, will result in a final grade of no greater than D.

Please consult with the program area or contact the program chair for further details. A minimum Grade Point Average of 2.0 is required for graduation.

GRADING SCHEME

Grade	**Percentage**	**Grade Point**	**Description**
A+	95-100	4.0	Exceptional: superior knowledge of subject matter
A	90-94	4.0	Excellent: outstanding knowledge of subject matter
A-	85-89	3.67	
B+	80-84	3.33	

B	75-79	3.0	Very Good: knowledge of subject matter generally mastered
B-	70-74	2.67	
C+	67-69	2.33	
C	64-66	2.0	Satisfactory/Acceptable: knowledge of subject matter adequately mastered
C-	60-63	1.67	
D+	57-59	1.33	
D	50-56	1.0	Minimal Pass
F	Less than 50	0.0	Fail: an unsatisfactory performance

REQUIRED LEARNING RESOURCES

- The recommended textbook is the University of Calgary Department of Chemistry Textbook: https://chem-textbook.ucalgary.ca/. It is a free online resource.
- TopHat will be used for in-class responses. Use the link https://app.tophat.com/register/ to register for TopHat.
- A lab coat, a pair of goggles, and a hard-bound lab notebook are required for labs.
- A Model Kit is recommended but not required.

Additional learning resources may be found in the Course Offering Information or in Brightspace.

ADDITIONAL INFORMATION

- Chemistry 30 (or equivalent) is highly recommended

Additional information may be found in the Course Offering Information or in Brightspace.

ACADEMIC ACCOMMODATIONS

Learners with a disability (learning, physical, and/or mental health) may qualify for academic and exam accommodations. For more information, or to apply for accommodations, learners should make an

appointment with Accessibility Services in the Learner Success Services (LSS) Department. Accessibility Services can also assist learners who may be struggling with learning but do not have a formal diagnosis. To make an appointment visit LSS on the first floor of the south campus or call 403-410-1440. It is the learner's responsibility to contact Accessibility Services and request academic accommodations. For more information, please visit our website at http://www.bowvalleycollege.ca/accessibility.

INSTITUTIONAL POLICIES

Bow Valley College is committed to the highest standards of academic integrity and honesty. Learners are urged to become familiar with and uphold the following policies: Academic Integrity (500-1-7), Learner Code of Conduct, Procedures and Guidelines (500-1-1), Learner Appeals (500-1-12), Attendance (500-1-10), Grading (500-1-6), Academic Continuance and Graduation (500-1-5), and Electronic Communications (300-2-13). Audio or video recording of lectures, labs, seminars, or any other teaching and learning environment by learners is allowed only with consent of the instructor as part of an approved accommodation plan. Recorded material is to be used solely for personal study and is not being used or distributed without prior written consent from the instructor.

Turnitin:

Students may be required to submit their course work to Turnitin, a third-party service provider engaged by BVC. Turnitin identifies plagiarism by checking databases of electronic books and articles, archived webpages, and previously submitted student papers. Students acknowledge that any course work or essays submitted to Turnitin will be included as source documents in the Turnitin.com reference database, where it will be used solely to detect plagiarism. The terms that apply to a student's use of Turnitin are described on Turnitin.com.

Online Exam Proctoring:

Examinations for this course may require proctoring through an online proctoring service. Online proctoring enables online exam taking within a controlled and monitored environment, thereby enhancing academic integrity. Online proctoring may occur through a variety of methods, including but not limited to:

a. live online proctoring where a remote invigilator authenticates identity and observes completion of an exam using specialized software and recordings;
b. automated proctoring where the exam session is recorded and AI (artificial intelligence) analyzed;
c. browser lockdown that limits access to other applications, websites, copying, printing, screen capture and other functions; or
d. a combination of both live/automated proctoring and browser lockdown.

Course instructors will review recordings, analyses, and data obtained through online proctoring for academic integrity infractions. It is the student's responsibility to meet the technical, software, location, and identity verification requirements necessary to enable online proctoring.

Further details of these policies are available in the Academic Calendar and on the Bow Valley College

website, bowvalleycollege.ca.

Learners are encouraged to keep a copy of this course outline for future reference.

Collection of Personal Information:

This course, including your image and voice, may be recorded and made available to you and other students taking the course section. By attending the class(es) online or in person, you consent to the collection of your personal information. If you do not wish to be recorded, please contact your instructor before starting the course/class to discuss alternative arrangements.

You may use the recordings only for educational purposes and you must not copy, share, or use the recordings for any other purpose without the instructor's express permission.

Your personal information is collected in accordance with section 33(c) of the Freedom of Information and Protection of Privacy Act (Alberta) to deliver academic programming, support learner flexibility, promote universal design for learning principles, and for purposes consistent with the course activities and outcomes. If you have any questions about the collection, disclosure, use, or protection of this information, please contact the College's Access and Privacy Officer at foip@bowvalleycollege.ca.