CHEM 2101 01, Introductory Inorganic Chemistry, Winter 2021
Faculty of Science Course Syllabus
Dalhousie University

Instructor	 **Dr. Marc Whalen**		
Office Hours (online: see Brightspace)	Wednesdays and Thursdays 10-11am		
email	marc.whalen@dal.ca		
Support staff	**Katherine Marczenko** coordinator	**Joseph Bedard** tutorial leader	**Toren Hynes** tutorial leader
Office Hours (online: see Brightspace)	Mon 5-6pm Fri 12-1pm	NA	NA
email	k.marczenko@dal.ca	joe.bedard@dal.ca	toren.hynes@dal.ca
Lectures (see Class Schedule)	All lectures will be available asynchronously on Brightspace (see **Class Schedule** below).		
Tutorials and Laboratory (see Class Schedule) *starting Jan 7/8*	Section B01 Section B02	Thurs 1-3:15 pm Friday 1:30-3:45pm	
	Weekly labs / tutorials will be held synchronously, accessed through Collaborate links on the Brightspace site (see **Class Schedule** below)		
Online Tools	Course Brightspace site (*CHEM2101 – Introductory Inorganic Chem. – 2021 Winter)*		

Course Description

For Winter 2021, this course will be offered exclusively in an online format

In the lecture you will gain a deeper understanding of fundamental models introduced in first year chemistry and use them to predict the structure and reactivity of compounds of the *s* and *p* blocks of the periodic table. General aspects of this chemistry will be highlighted systematically, group by group, focusing on periodic trends, industrial production, societal impacts, and environmental issues. You will also gain a foundational understanding of molecular symmetry, which will provide insight into modern structure determination methods and molecular orbital theory. Structures and thermodynamics of solids will also be introduced.

Laboratory exercises are integrated with the course material and will provide opportunities to apply course concepts to the characterization of inorganic compounds.

Lecture and laboratory components will be supported through mandatory weekly online group work (tutorials) using Blackboard Collaborate, which is accessible on the course site.

Course Prerequisites

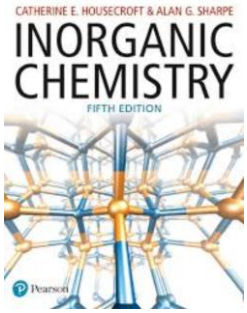
CHEM 1011/1012 or equivalent (minimum grade of C-)

Required Texts. The course will follow the textbook closely.

"Inorganic Chemistry". **C.E. Housecroft** (2018). 5th ed. Pearson Publications. ISBN 9781292134161

Textbook: Essential readings and end-of-chapter problems (purchase options are outlined below)

Solutions Manual: Detailed solutions to the end-of-chapter problems (posted on Brightspace)



Textbook Purchase Options.

Format	Price	Source
e-text (pdf)	$36.64 (1 year) $61.07 (lifetime)	Vital Source (online)
https://www.vitalsource.com/en-ca/products/inorganic-chemistry-catherine-housecroft-v9781292134161		
print	194.70	Dalhousie Bookstore
https://bookstore.dal.ca/CourseSearch/?course[]=SUB,WINT21,CHEM,CHEM2101,&		

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Course Learning Outcomes

Upon completion of this course, you will be able to:

- Acquire knowledge of chemistry on your own from scientific texts
- Communicate orally with peers using the language of chemistry
- Explain and predict basic structures and reactions using the concepts of:
    - periodic trends (size, effective nuclear charge, electronegativity, ionization energy, electron affinity)
    - Bronsted and Lewis acidity/basicity
    - intermolecular interactions
    - modern bonding theories
    - thermodynamics
    - kinetics
    - modern bonding theories (molecular orbital, valence bond)
- Classify molecules using the principles of molecular symmetry
- Use the principles of molecular symmetry to interpret NMR (nuclear magnetic resonance) and vibrational (infrared and Raman) spectra of inorganic molecules

Course Policies

Class announcements: The instructors will post announcements regularly on the course Brightspace site (https://dal.brightspace.com/d2l/home/143152)

Contacting instructors: Outside of scheduled tutorials and designated office hours, please contact instructors directly by email only.

Meeting with instructors outside of office hours: Please note that outside of office hours, meeting with the instructors is by appointment only. If you wish to set up a (virtual) meeting, please email the instructor(s), clearly indicating the reason you wish to meet as well as your availability.

Late/missed submittal of a quiz, assignment, etc: For each weekday after the posted due date, 10% will be deducted. A submitted SDA form will excuse one day late (unless alternate arrangements are made with the instructor). If serious circumstances, such as an illness, result in student absence for an extended period of time (>3 consecutive days) and in missing of multiple academic deadlines, students should contact Patricia Laws, Assistant Dean of Student Affairs (sciasst@dal.ca) as soon as possible to make alternate arrangements.

Missed midterm: If you miss a midterm for any reason, no make-up will be offered. You are required to submit an SDA form within 24 hours of the missed midterm. The instructor will then transfer the points from the missed midterm to the final exam.

Missed final exam: No SDA form is required. The student is required to contact the instructor by email to make alternate arrangements for writing the final exam after the end of the exam period posted by the Registrar.

Attending weekly online tutorial sessions: Attendance is required and participation comprises a significant portion of your grade (see **Course Assessment**). In the first week of class you will be assigned to a tutorial group. You must stay with that group for the duration of the course unless other arrangements have been made with the course instructor.

Tutorial Preparation: Students are expected to prepare in advance for tutorials (textbook readings, end-of-chapter problems and attempts at solving the assignment or lab). Participation guidelines are outlined in the **participation rubric** posted on Brightspace.

Testable Material: All material presented in online lectures, tutorials, labs and assignments is testable in the midterm and final exam. All concepts represented in assigned textbook readings and end-of-chapter problems are also testable.

Short-term Absence Policy for Missed Academic Requirements:
In this course, an academic requirement is defined as:

- Midterm
- Laboratory / tutorial session
- Submittal of assigned work

If you miss an academic requirement, Dalhousie University requires a **Student Self-Declaration of Absence (SDA)** form to be submitted **online**. Sick notes should not be submitted. For a full statement of the policy see:
https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

SDA forms should be submitted within 24 hours of a missed or late academic requirement. Students can use the SDA form **twice** in this course. Once an SDA is submitted, the student is also required to email the instructor ASAP to make arrangements for making up the academic requirement according to the discretion of the instructor and **Course Policies (above).**

Course Assessment: The following table outlines the assessment scheme for this course.

Component	Submitted Portion	Tutorial Participation	Combined points	Combined points (%)
Assignment 1	2		2	1.33
Assignment 2	5	2	7	4.67
Assignment 3	5	2	7	4.67
Assignment 4	5	2	7	4.67
Assignment 5	5	2	7	4.67
Assignment 6	5	2	7	4.67
Assignment 7	5	2	7	4.67
Assignment 8	5	2	7	4.67
Lab 1	10*	3	13	8.67
Lab 2	10*	3	13	8.67
Lab 3	10*	3	13	8.67
Midterm	20		20	13.33
Final Exam			40	26.67
Total Grade			150	100.00

*Submitted portions of labs 1, 2, and 3 will consist of a pre-tutorial quiz (2 points) and a post-tutorial quiz associated lab content (submitted as an assignment in Brightspace; 8 points).

Performance Expectations

To manage your expectations and to help you achieve your goals, the following grading rubric provides definitions of performance expectations according to the **Dalhousie Common Grade Scale**. Please refer to these when considering how to prepare for testing and submitting assigned work.
https://www.dal.ca/campus_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html.

Grade	Grade Point Value	Score	Definition	Performance
A+	4.30	90-100	Excellent	Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
A	4.00	85-89		
A-	3.70	80-84		
B+	3.30	77-79	Good	Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.
B	3.00	73-76		
B-	2.70	70-72		
C+	2.30	65-69	Satisfactory	Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.
C	2.00	60-64		
C-	1.70	55-59		
D	1.00	50-54	Marginal Pass	Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of ‘C’ is required).
FM	0.00		Marginal Failure	Available only for Engineering, Health Professions and Commerce.
F	0.00	0-49	Inadequate	Insufficient evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.

Class Schedule (subject to change). Readings from the course textbook unless otherwise stated.

Week	Day	Date	Online Lectures Posted (by 10 am)	Labs and Assignments (contents)	Tutorial (Topics)	Due 8pm
1	W	**Jan** 6	Chapter 2 & 8	Assignment 1 (submit a pdf)		
	Th	7			meet & greet Q&A	
	F	8				
2	M	11	Chapter 3	Assignment 2 (Chapter 2, 8)		Assignment 1
	Th	14			Assignment 2	
	F	15				
3	M	18	Chapter 5	Assignment 3 (Chapter 3 & 5)		Assignment 2
	Th	21			Assignment 3	
	F	22				
4	M	25	Chapter 4 (NMR and vibrations)	Assignment 4 (Chapter 3 & 4)		Assignment 3
	Th	28			Assignment 4	
	F	29				
5	M	**Feb** 1	Chapter 6 & Lab 1	Assignment 5 (Chapter 6) & Lab 1		Assignment 4
	Th	4			No tutorials (Monroe Day)	
	F	5				
6	M	8	Chapter 7 & 9			
	Th	11			Assignment 5 & Lab 1	
	F	12				
Week 7: Heritage Day and Winter Break (No Classes)						
8	M	22	Chapter 10 - 12			Assignment 5 & Lab 1
	Th	25			Midterm 1-3pm	
	F	26			Midterm 1:30-3:30 pm	
9	M	**Mar** 1	Chapter 13, 14	Assignment 6 (Chapter 10 – 13)		
	Th	4			Assignment 6	
	F	5				
10	M	8	Chapter 15, 16	Assignment 7 (Chapter 14 – 16)		Assignment 6
	Th	11			Assignment 7	
	F	12				
11	M	15		Lab 2		Assignment 7
	Th	18			Lab 2	
	F	19				
12	M	22	Chapter 17, 18	Assignment 8 (Chapter 17, 18)		Lab 2
	Th	25			Assignment 8	
	F	26				
13	M	29		Lab 3		Assignment 8
	Th	**Apr** 1			No tutorials (Good Friday)	
	F	2				
14	M	5				
	Th	8			Lab 3	
	F	9				
15	Mon	12				Lab 3
** Online exam scheduled by the registrar ***						

Details of Textbook Readings.

Lectures will focus on the following sections from Inorganic Chemistry (Housecroft) unless otherwise stated. You will also be assigned textbook problems to solve, that will prepare you for the tutorials, assignments and testing. Answers to all non-descriptive problems are found in the back of the textbook. Answers to end-of chapter problems are found in the textbook Solutions Manual posted on Brightspace.

Chapter 2: Basic Concepts – molecules

- 2.1 Bonding models: an introduction
  - A historical overview
  - Lewis structures
- 2.2 Homonuclear diatomic molecules: valence bond (VB) theory
  - Uses of the term *homonuclear*
  - Covalent bond distance, covalent radius and Van der Waals radius
  - The valence bond (VB) model of bonding in H_2
  - The valence bond model applied to F_2, O_2 and N_2
- 2.3 Homonuclear diatomic molecules
  - An overview of the MO model
  - MO theory applied to H_2
  - The bonding in He_2, Li_2, Be_2
  - The bonding in F_2 and O_2
  - What happens if the s-p separation is small?
- 2.4 The octet rule and isoelectronic species
  - The octet rule: first row p-block elements
  - Isoelectronic species
  - The octet rule: heavier p-block elements
- 2.5 Electronegativity values
  - Pauling electronegativity values, χ^P
- 2.6 Dipole moments
  - Polar diatomic molecules
  - Molecular dipole moments
- 2.7 MO theory: heteronuclear diatomic molecules.
  - Which orbital interactions should be considered?
  - Hydrogen fluoride
- 2.8 Molecular shape and the VSEPR Model
  - Valence-shell electron-pair repulsion model
  - Structures derived from a trigonal bipyramid
  - Octahedral species
  - Trigonal bipyramidal species

Chapter 3: Introduction to molecular symmetry

- 3.1 Introduction
- 3.2 Symmetry operations and symmetry elements
- 3.3 Successive operations
- 3.4 Point groups
- 3.5 Character tables: an introduction
- 3.6 Why do we need to recognize symmetry elements?
- 3.7 Vibrational spectroscopy
  - How many vibrational modes are there for a given molecular species?
  - Selection rules for an infrared or Raman active mode of vibration
  - Linear ($D_{\infty h}$ or $C_{\infty v}$) and bent (C_{2v}) triatomic molecules
  - Bent molecules XY_2: using the C_{2v} character table
  - XY_3 molecules with D_{3h} symmetry

Chapter 4 Experimental techniques

- 4.6 Infrared and Raman spectroscopies
  - Energies and wavenumbers of molecular vibrations
  - The Fourier Transform infrared (FT-IR) spectrometer and sample preparation
  - Diagnostic absorptions
  - Deuterium/hydrogen exchange
  - Raman spectroscopy

- 4.8 Nuclear magnetic resonance (NMR) spectroscopy
    - NMR active nuclei and isotope abundance
    - Which nuclei are suitable for NMR spectroscopic studies?
    - Resonance frequencies and chemical shifts
    - Chemical shift ranges
    - Solvents for solution studies
    - Integration of signals and signal broadening
    - Homonuclear spin-spin coupling: ^{1}H-^{1}H
    - Heteronuclear spin-spin coupling: ^{13}C-^{1}H
    - Case studies:
        - Case study 1: ^{31}P NMR spectrum of PF_6^-
        - Case study 3: ^{11}B NMR spectrum of BH_4^-
        - Case study 4: $^{31}P\{^{1}H\}$ NMR spectrum of $PhMe_2PBMe_3$
        - Case study 5: ^{19}F NMR spectrum of $[XeF_5]^-$

Chapter 5: Bonding in polyatomic molecules

- 5.1 Introduction
- 5.2 Valence bond theory: hybridization of atomic orbitals
    - What is orbital hybridization?
    - sp hybridization: a scheme for linear species
    - sp^2 hybridization: a scheme for trigonal planar species
    - sp^3 hybridization: a scheme for tetrahedral and related species
    - Other hybridization schemes
- 5.3 Valence bond theory: multiple bonding in polyatomic molecules
- 5.5 Molecular orbital theory: the ligand group orbital approach and application to triatomic molecules
    - Molecular orbital diagrams: moving from a diatomic to a polyatomic species
    - MO approach to bonding in linear XH_2: symmetry matching by inspection
    - MO approach to bonding in linear XH_2: working from molecular symmetry
    - A bent triatomic: H_2O
- 5.6 Molecular orbital theory applied to polyatomic molecules BH_3 and NH_3
    - BH_3
    - NH_3

Supplemental reading: Walsh diagrams applied to XY_2 and XY_3

Chapter 6: Structures and energetics of metallic and ionic solids

- 6.1 Introduction
- 6.2 Packing of spheres
    - Cubic and hexagonal close-packing
    - The unit cell: hexagonal and cubic close-packing
    - Interstitial holes: hexagonal and cubic close-packing
    - Non-close-packing: simple cubic and body-centered cubic arrays
- 6.3 The packing-of-spheres model applied to the structures of elements
    - Group 18 elements in the solid state
    - H_2 and F_2 in the solid state
    - Metallic elements in the solid state
- 6.4 Polymorphism in metals
    - Polymorphism: phase changes in the solid state
    - Phase diagrams
- 6.5 Metallic radii
- 6.6 Melting points and standard enthalpies of atomization of metals
- 6.10 Sizes of Ions
    - Ionic radii
    - Periodic trends in ionic radii
    - Box 6.4 Radius ratio rules
- 6.11 Ionic Lattices
    - The rock salt (NaCl) structure type
    - The caesium chloride (CsCl) structure type
    - The fluorite (CaF_2) structure type
    - The antifluorite structure type
    - The zinc blende (ZnS) structure type
    - The β-cristoballite (SiO_2) structure type

- The wurtzite (ZnS) structure type
- The rutile (TiO_2) structure type

- 6.13 Lattice Energy: estimates from an electrostatic model
  - Coulombic attraction within an isolated ion-pair
  - Coulombic interactions in an ionic lattice
  - Born forces
  - The Born-Lande equation
  - Madelung constants
  - Refinements to the Born-Lande equation
  - Overview
- 6.14 Lattice energy: The Born-Haber cycle
- 6.15 Lattice energy: 'calculated' vs. 'experimental' values
- 6.16 Estimating lattice energies of new materials
  - The volume-based thermodynamic (VBT) approach
- 6.17 Applications of lattice enthalpies (all sub-sections)

Chapter 7: Acids, bases and ions in aqueous solution

- 7.1 Introduction
- 7.7 Aquated ions: formation and acidic properties
  - Water as a Lewis base
  - Aquated cations as Bronsted acids
- 7.8 Amphoteric oxides and hydroxides
  - Amphoteric behaviour
- 7.9 Solubilities of ionic salts
  - Solubility and saturated solutions
  - The energetics of the dissolution of an ionic salt: $\Delta_{sol}G^o$
  - The energetics of the dissolution of an ionic salt: hydration of ions
  - Solubilities: some concluding remarks
- 7.11 Coordination complexes: an introduction
  - Definitions and terminology
- 7.13 Factors affecting the stabilities of complexes containing only monodentate ligands
  - Ionic size and charge
  - Hard and soft metal centers and ligands

Chapter 8

- 8.1 Introduction
  - Oxidation and reduction
  - Oxidation states
  - Stock nomenclature

Chapter 9: Non-aqueous media

- 9.1 Introduction
- 9.4 Acid-base behaviour in non-aqueous solvents (including all sub-sections)
- 9.5 Liquid sulfur dioxide
- 9.6 Liquid ammonia (including all sub-sections)
- 9.7 Liquid hydrogen fluoride (including all sub-sections)
- 9.8 Sulfuric acid and fluorosulfuric acid (including all sub-sections)
- 9.9 Superacids (including all sub-sections)
- 9.10 Bromine trifluoride (including all sub-sections)
- 9.12 Ionic liquids
  - Ionic liquids at ambient temperature

Chapter 10: Hydrogen

- 10.1 Hydrogen: The simplest atom
- 10.2 The H^+ and H^- ions
    - The hydrogen ion (proton)
    - The hydride ion
- 10.3 Isotopes of hydrogen
    - Protium and deuterium
    - Deuterated compounds
- 10.4 Dihydrogen
    - Occurrence
    - Physical properties
    - Synthesis and uses
    - Reactivity
- 10.5 Polar and non-polar E-H bonds
- 10.6 Hydrogen bonding
    - The hydrogen bond
    - Trends in boiling points, melting points and enthalpies of vaporization for p-block binary hydrides
- 10.7 Binary hydrides: classification and general properties
    - Classification
    - Saline hydrides
    - Molecular hydrides and complexes derived from them (exclude transition metal hydrides)
    - Covalent hydrides with extended structures

Chapter 11: Group 1 – The alkali metals

- 11.1 Introduction
- 11.2 Occurrence, extraction and uses
    - Occurrence
    - Box 11.1
    - Extraction
    - Major uses of the alkali metals and their compounds
- 11.3 Physical properties
    - General properties
    - Atomic spectra and flame tests
- 11.4 The metals
    - Appearance
    - Reactivity
- 11.5 Halides
- 11.6 Oxides and hydroxides
    - Oxides, peroxides, superoxides and ozonides
    - Hydroxides

Chapter 12

- 12.1 Introduction
- 12.2 Major uses of group 2 metals and their compounds
- 12.3 Physical properties
    - General properties
    - Box 12.1
    - Box 12.2
- 12.4 The metals
    - Reactivity
- 12.5 Halides
    - Beryllium halides
    - Halides of Mg, Ca, Sr, Ba (first paragraph only)
    - Box 12.4
- 12.6 Oxides and hydroxides
    - Oxides and peroxides
    - Box 12.5
- 12.8 Complex ions in aqueous solution
    - Aqua species of beryllium
    - Aqua species of Mg^{2+}, Ca^{2+}, Sr^{2+} and Ba^{2+} (first paragraph only)

- 12.10 Diagonal relationships between Li and Mg and between Be and Al
    - Lithium and magnesium
    - Beryllium and aluminium

Chapter 13: The group 13 elements

- 13.1 Introduction
- 13.2 Occurrence, extraction and uses
    - Extraction (first paragraph)
    - Major uses of the group 13 elements and their compounds
- 13.3 Physical properties
    - Electronic configurations and oxidation states
    - Box 13.4
    - NMR active nuclei
- 13.4 The elements
    - Structures of the elements
- 13.5 Simple hydrides
    - Neutral hydrides
    - The $[MH_4]^-$ ions
- 13.6 Halides and complex halides
    - Boron halides: BX_3 and B_2X_4
    - Al(III), Ga(III), In(III) and Tl(III) halides and their complexes
- 13.7 Oxides, oxoacids, oxoanions and hydroxides
    - Boron oxides, oxoacids and oxoanions
    - Worked example 13.5 isoelectronic relationships
    - Aluminum oxides, oxoacids, oxoanions and hydroxides
- 13.8 Compounds containing nitrogen
    - Nitrides
    - Molecular species containing B-N or B-P bonds
- 13.11 Electron deficient borane and carbaborane clusters: an introduction

Chapter 14: The group 14 elements

- 14.1 Introduction
- 14.2 Occurrence, extraction and uses
    - Occurrence
    - Uses
- 14.3 Physical properties
    - Ionization energies and cation formation
    - Some energetic and bonding considerations
- 14.4 Allotropes of carbon
    - Graphite and diamond: structure and properties
    - Fullerenes: synthesis and structure
- 14.5: Structural and chemical properties of silicon, germanium, tin and lead
    - Structures
    - Chemical properties
- 14.6 Hydrides
    - Binary hydrides
- 14.7 Carbides, silicides, germides, stannides and plumbides
    - Carbides
    - Silicides
- 14.8 Halides and complex halides
    - Carbon halides
    - Silicon halides
    - Halides of germanium, tin and lead
- 14.9 Oxides, oxoacids, and hydroxides
    - Oxides and oxoacids of carbon
    - Silica, silicates and aluminosilicates
- 14.10 Siloxanes and polysiloxanes (silicones)

Chapter 15: The group 15 elements

- 15.1 Introduction
- Box 15.1 Toxicity of arsenic
- 15.2 Occurrence, extraction and uses
    - Occurrence
    - Extraction
    - Uses
- 15.3 Physical properties
    - Bonding considerations
- 15.4 The elements
    - Nitrogen
    - Phosphorus
- 15.5 Hydrides
    - Trihydrides, EH_3 (E = N, P, As, Sb, Bi)
    - Hydrides E_2H_4 (E = N, P, As)
- Box 15.3 Ammonia: an industrial giant
- 15.7 Halides, oxohalides and complex halides
    - Nitrogen halides
    - Phosphorus halides
- 15.8 Oxides of nitrogen
    - Dinitrogen monoxide, N_2O
    - Nitrogen oxide, NO
    - Dinitrogen tetraoxide, N_2O_4, and nitrogen dioxide, NO_2
    - Box 15.7 NO_x: tropospheric pollutant
    - Box 15.9 Nitrogen cycle and nitrates and nitrites in waste water
- 15.10 Oxides of phosphorus, arsenic, antimony, bismuth
    - Oxides of phosphorus
    - Box 15.10: Phosphate fertilizers: essential to crops but are they damaging our lakes?

Chapter 16: The group 16 elements

- 16.1 Introduction
- 16.2 Occurrence, extraction and uses
    - Extraction
    - Uses
- 16.3 Physical properties and bonding considerations
- 16.4 The elements
    - Dioxygen
    - Ozone
    - Sulfur: Allotropes
- 16.5 Hydrides
    - Water, H_2O
    - Hydrogen peroxide, H_2O_2
    - Hydrides H_2E (E = S, Se, Te)
- 16.7 Halides, oxohalides and complex halides
    - Oxygen fluorides
    - Sulfur fluorides and oxofluorides
    - Halides of selenium and tellurium
- 16.8 Oxides
    - Oxides of sulfur (only SO_2 and SO_3)
    - Box 16.5 and Box 16.6
    - Oxides of selenium and tellurium
- 16.9 Oxoacids and their salts
    - Sulfuric acid, H_2SO_4

Chapter 17: The group 17 elements

- 17.1 Introduction
- 17.2 Occurrence, extraction and uses
    - Occurrence
    - Extraction
    - Uses

- 17.3 Physical properties and bonding considerations
- 17.4 The elements
    - Difluorine
    - Dichlorine, dibromine and diiodine
- 17.5 Hydrogen halides
- 17.6 Metal halides: structures and energetics
- 17.7 Interhalogen compounds and polyhalogen ions
    - Interhalogen compounds
    - Bonding in $[XY_2]^-$ ions (referring to Section 5.8)

Chapter 18: The group 18 elements

- 18.1 Introduction
- 18.2 Occurrence, extraction and uses
    - Occurrence
    - Extraction
    - Uses
- 18.3 Physical properties
- 18.4 Compounds of xenon
    - Fluorides
- 18.5 Compounds of argon, krypton and radon

Student technical support

Dalhousie provides student support for technical issues associated with viewing and accessing online content provided by Dalhousie university. sciehelp@dal.ca / 902-494-4357

University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: http://www.dal.ca/cultureofrespect.html)

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy)

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: https://www.dal.ca/faculty/science/current-students/academic-advising.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: https://libraries.dal.ca/

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Fair Dealing Guidelines https://libraries.dal.ca/services/copyright-office/fair-dealing.html

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: https://dsu.ca/dsas

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Biosafety: https://www.dal.ca/dept/safety/programs-services/biosafety.html

Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html

Radiation Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety.html

Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html