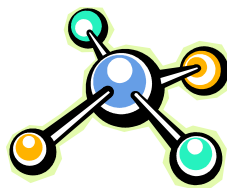




CHEMISTRY 2000



General Chemistry II
Fall 2020
Dr. Susan Findlay
Review Atomic Orbitals,
Electron Configurations,
and Lewis Diagrams





CHEM 2000 Teaching Team



Dr. Susan Findlay

BSc Applied Chemistry; University of Guelph
PhD Organic Chemistry; University of Calgary

Mother of two energetic boys, outdoor enthusiast,
board game connoisseur and Pokémon Go addict.



Introductory Chemistry

- CHEM 1000 and 2000

Organic Chemistry

- CHEM 2500 and CHEM 2600
- CHEM 4000 (Medicinal Chemistry)





CHEM 2000 Teaching Team

John Eng

BSc Biochemistry; Simon Fraser University

U of L since 1987 – still in school!

Lethbridge Sports Hall of Fame inductee (lacrosse),
Team Alberta lacrosse coach and mentor, and
proud new grandpa



CHEM 2000 and 2410 Lab Co-ordinator

Introductory Chemistry

- CHEM 0500 and 1000

Chemistry and Society

- CHEM 2310



Contact Information

- If you have any questions outside of class/lab, you can reach us:
 - message us on Piazza! <https://piazza.com/uleth.ca/fall2020/chem2000>
 - via email: susan.lait@uleth.ca, engj@uleth.ca (If you email, please specify the course number and follow proper email etiquette – use of salutation, complete sentences, etc.)

- Websites you'll need to access:
 - <https://moodle.uleth.ca/> (lab course and lecture course are separate!)
 - <https://piazza.com/uleth.ca/fall2020/chem2000> (for questions, answers, etc.)
 - <https://www.saplinglearning.ca/ibiscms> (for weekly online assignments)
 - <http://scholar.ulethbridge.ca/susanfindlay> (home of Susan's lecture notes, practice questions, practice tests, etc.)



Welcome to CHEM 2000!

- What's Chemistry 2000 about?
 - CHEM 2000 is the second half of a full year course in general chemistry. It should ideally be taken within one year of completing CHEM 1000; if not, plan to review your CHEM 1000 notes thoroughly! The goal of these courses is to introduce you to university-level chemistry and to give you an appreciation for the diversity of the field.
- You will need:
 - *Chemistry The Molecular Nature of Matter and Change, Second Canadian Edition* by Silberberg, Amateis, Lavieri & Venkateswaran (*or any other good first year chemistry text*)
 - *Lab Manual* (on Moodle)
 - *Lab Coat* and **Safety Glasses** (University Bookstore)
 - *Face Mask* (must be worn in public areas on campus this fall)
 - *Lock* (coats, backpacks, etc. cannot enter lab; use a locker)
 - *Calculator* (WITHOUT wireless communication capability; required for labs and tests; recommended that you bring to lecture as well)



Pre-Requisite Knowledge

- In order to succeed in Chemistry 2000, you must have completed:
 - CHEM 1000 – preferably with a minimum grade of C-
 - Grade 12 Mathematics or equivalent (typically Math 30-1)

- Mathematical knowledge/skills required to succeed in CHEM 2000:
 - Algebra: rearranging equations (including those with fractions and/or logarithms)
 - Graphically adding and subtracting functions such as waves
 - Significant figure rules
 - Use of units
 - Use of units
 - Use of units
 - Use of units

...did I mention the part about using units?



Pre-Requisite Knowledge

- Chemistry knowledge/skills required to succeed in CHEM 2000:
 - From High School:
 - Stoichiometry (the mole, molar masses, limiting reagents, balancing equations, etc.)
 - Solution chemistry (dilutions, calculating concentration, etc.)
 - Equilibrium, equilibrium constants and Le Châtelier's principle
 - Acid-Base chemistry (simple reactions, calculating pH)
 - Gases (ideal gas law)
 - Thermodynamics (enthalpy, exothermic/endothermic reactions)
 - From CHEM 1000:
 - Atomic orbitals (shapes, nodes, relative energies)
 - Electron configurations (line notation vs. noble gas abbreviation, Hund's rule, Pauli exclusion principle, counting valence electrons)
 - Periodic trends
 - Lewis diagrams (including resonance structures & bond properties)
 - VSEPR (electron group geometry, molecular geometry, drawing molecules to clearly show their shape, identifying whether a molecule is polar or nonpolar)



Grade Composition

| | Dates | Value |
|------------------------------------|---|-----------------------|
| Laboratory | <i>see laboratory schedule</i> | 25% |
| Assignments | <i>due each Sunday night at midnight</i> | 10% |
| Midterm Tests (90 minutes each) | Tuesday afternoon/evenings: Oct. 6 th , Oct. 27 th and Nov. 17 th | 45% (3 @ 15% each) |
| Final Exam (3 hours) | <i>scheduled by Registrar's Office after Add/Drop</i> | 20% |
| Total | | 100% |

YOU MUST PASS BOTH THE LAB (12.5/25) AND LECTURE (37.5/75)
PORTIONS OF THE COURSE SEPARATELY
IN ORDER TO RECEIVE ANY GRADE OTHER THAN 'F'.



Weekly Online Assignments (“Sapling”)

- Found at <https://www.saplinglearning.ca/ibiscms>
- Once there, click on “Create Account” under the blue Login button.
- Create an account. Please use your real name and @uleth.ca email.
- Sapling will send you an email to ensure that you are not a spambot. Check for it before continuing as you will need to click a link in this email to activate your account.
- Find “University of Lethbridge – CHEM 2000 – Fall20 – FINDLAY” under General Chemistry Semester **(2.)** This is the second semester of intro chem!
- Sapling can be accessed for free from anywhere until Sept. 23rd. After that, access from computers in Anderson Hall remains free but access from elsewhere will require purchase of an access code. 6 month codes are good for 1 course; 12 month codes are good for a pair of linked courses (CHEM 1000/2000 or CHEM 2500/2600). Students who require a cost-free alternative should email Susan Findlay before Wed. Sept. 16th.
- ***Assignments are due at midnight every Sunday night. Late penalty is 20% per day (except due to illness, etc. severe enough to warrant exemption from a midterm).***



Midterm Tests

- Tests will be of the same length as our typical in-person tests for which students are given 90 minutes to write.
- Students are expected to reserve a 90 minute block of time between 3pm and 9pm on the scheduled dates during which they can write the test. If that is not possible due to conflicts with other courses, contact Susan Findlay at least a week before the test.
- Tests will be distributed at 3pm on the day of the test. Answers must be written by 9pm and submitted by 9:30pm that day.
- As of 3pm, every student is considered to be “writing the test” whether or not they have looked at it yet. Within the test window, studying online or communicating about course topics is forbidden.
- Answers will be written on paper, scanned/photographed and submitted using the Crowdmark website (accessed via Moodle).
- ***Students who are excused from a test due to illness or compassionate reason will have the value of the test added to the value of their final exam. The final exam will be cumulative in order to ensure that all students are evaluated on all course material.***



Approximate Schedule

| Topic | | Week |
|---|--|-------------|
| Bonding: What Holds Atoms Together? | Molecular Orbital Theory of Diatomic Molecules LCAO Theory for Molecules Larger than Two Atoms Multiple Bonds and Electron Delocalization Spectroscopy Metallic Bonding Very Brief Introduction to Valence Bond Terminology | 1 – 5 |
| Thermochemistry: What Makes Reactions Go? | Entropy and Free Energy Free Energy and Equilibrium Phase Diagrams Redox Reactions Electrochemistry | 5 – 9 |
| Introducing Organic Chemistry | Drawing Organic Molecules Functional Groups Isomers and Stereochemistry Classes of Organic Reactions Organic Acids and Bases | 9 – 12 |