

University of Windsor
Chemistry and Biochemistry
Chemistry 59-110, Winter Term 2010

Lectures:

Tues. and Thurs. 10:00-11:20 am in the Toldo Health Education Centre room 100 (Section 2)
Tues. and Thurs. 1:00-2:20 pm in the Toldo Health Education Centre room 202 (Section 1)

Professor:

Dr. Charles Macdonald
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website: www.uwindsor.ca/macdonald-chem

Office Hours:

Tuesdays and Thursdays 3-6 pm or by appointment only

Laboratory Coordinator:

Ms. Tina Lepine
office: 175 Essex Hall
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phone: 519-253-3000 ext. 3547

Textbook:

Chemistry: The Molecular Nature of Matter and Change, 5th edition by Martin Silberberg (MS);
McGraw-Hill: Boston, 2009. ISBN: 0073048593

This is a detailed introductory textbook for General Chemistry that is also used for the other first year classes (so you should have no problem obtaining a used textbook or in selling your copy after the course).

There is a companion web site for the book found at:

<http://www.mhhe.com/silberberg5>

or

<http://highered.mcgraw-hill.com/classware/infoCenter.do?isbn=0073048593>

This web site has additional information from the book and numerous practice problems relating to the material in the book that you may wish to attempt – these problems are intended only as practice for you so please do not use the option to e-mail the results to me.

The textbook is **mandatory**, I will assign material to read from these books and I will be posting suggested practice problems from the text. We will examine problems in the class time regarding material in class that you are expected to have already read.

TurningPoint® "Clickers":

Each student is required to purchase and register a TurningPoint® wireless response card (the devices

are available at the bookstore and details about the use of the devices can be found in the "educational technologies" link at the University of Windsor Centre for Teaching and Learning website (www.uwindsor.ca/ctl). These devices will be used throughout the term in order that the student may assess their own comprehension of a topic through multiple-choice questions. Participation in at least 75% of these exercises will earn the student full credit for participation; participation is recorded automatically and the grade assigned is non-negotiable. *These devices are used for many other courses and can be sold back to the bookstore upon completion of the course if you will not use it in the future.*

Laboratory Manual:

59-110 Topics in General Chemistry Lab Manual, Winter 2010; Department of Chemistry & Biochemistry, University of Windsor.

Attendance of all components of the laboratory is mandatory and failure of the laboratory section of the course will result in the automatic failure of the course – please consult the laboratory manual for complete details in regard to the requirements and regulations regarding the laboratory. In order to attend the lab, you must wear appropriate clothing and safety equipment including approved safety glasses/goggles and a lab coat. You must also purchase a caution card from the Cashier's office.

Assignments:

The assignments that you are required to complete for this course are found on the online resource called Learning Online with CAPA (lon-capa) that is found at the url:

<http://uwindsor.lon-capa.net/>

The due dates for the various assignments that are found on the site will be announced in class and posted on the website during the course.

Course website:

The current website at:

<http://mutuslab.cs.uwindsor.ca/macdonald/Teaching/0359-110.htm>

will be migrating to a CLEW site at:

<http://clew.uwindsor.ca/>

in order to facilitate communication with the class.

Resource Centre:

There is a student resource centre in Essex Hall 182-1 in which there will be a teaching assistant available to assist you with questions regarding Chemistry.

Grading:

The overall grade will be based upon the sum of:

A midterm examination (90 minutes long): **34%**

A final exam (90 minutes long): **34%**

Assignments (using the lon-capa site: <http://uwindsor.lon-capa.net/>): **10%**

Laboratory: **20%** (the lab must be passed to pass the course)

Participation: **2%** (as assessed by the use of the "clickers")

The final letter grade will be determined by the following Senate-approved conversion table:

93-100 = A+	86-92.9 = A	80-85.9 = A-
77-79.9 = B+	73-75.9 = B	70-72.9 = B-
67-69.9 = C+	63-65.9 = C	60-62.9 = C-
57-59.9 = D+	53-55.9 = D	50-52.9 = D-
35-49.9 = F	0-34.9 = F-	

If any scaling of the final grades is required for this course, it will be done using the overall numerical grade for the course and the letter grade for each student will equal or exceed the corresponding letter grade in the table above.

Test Dates: Please be sure to bring an approved calculator and a sufficient number of pens to each examination!

Midterm Examination: Saturday, February 27, 1:00 pm in Erie Hall 1120 & 2123.

This will cover all material until this date.

Final Examination: Friday, April 16, 8:30 am (exam slot 17).

This will cover all material after the midterm.

Please note: If you are unable to write an examination, you must provide me with an acceptable excuse within 12 hours (before or after, by phone message or e-mail) of the proscribed time or you will receive a grade of 0% on that test. There will NOT be a make-up/rewrite for the midterm, if you miss it, you will be required to write a 3 hour comprehensive exam covering all of the material in the course. In any case, if you do not write the final exam, you will receive a grade of 0% for the exam; your grade may only be changed through a formal application for an Aegrotat assessment.

Students caught cheating (or engaging in any form of academic misconduct) will receive an automatic grade of 0% on that work, will be reported to the Department and are subject to disciplinary action as proscribed in Senate By-Law 31. Ignorance of the rules and requirements does not excuse such actions so you are expected to be familiar with the regulations found at the end of this document and in the current calendar.

Last Date for Voluntary Withdrawal from Course: March 17, 2010

Student evaluation of this class will be conducted during the last two weeks of the term as per the Senate regulations.

Course Outline

COURSE CONTENTS (courtesy of Dr. Jorge Llano's, Summer 2009 version of the course)

◇ Unit 1. Basic Concepts of Chemistry

- 1.1- Chemistry as a natural science
- 1.2- Measurement fundamentals
- 1.3- Overview of the microscopic structure of matter
- 1.4- Periodic law and the classification of groups of like elements
- 1.5- Foundations of chemical nomenclature
- 1.6- Composition and transformation of matter

References:

Chapter 1. *Keys to the Study of Chemistry*; p. 2

Chapter 2. *The Components of Matter*; p. 40

◇ Unit 2. Stoichiometry

- 2.1- Chemical formulas
- 2.2- Basic concepts of stoichiometry
- 2.3- Composition stoichiometry
- 2.4- Writing and balancing chemical equations
- 2.5- Reaction stoichiometry
- 2.6- Gas-phase stoichiometry
- 2.7- Solution stoichiometry
- 2.8- Acid-base equilibria

References:

Chapter 3. *Stoichiometry of Formulas and Equations*; p. 89

Chapter 4. *Three Major Classes of Chemical Reactions*; p. 140

Chapter 5. *Gases and the Kinetic-molecular Theory*; p. 186

Chapter 19. *Ionic Equilibria in Aqueous Systems*; p. 831

◇ Unit 3. Thermodynamics: Internal Energy & Enthalpy

- 3.1- General concepts
- 3.2- Conservation of energy
- 3.3- Thermochemical tables: enthalpies of formation

References:

Chapter 6. *Thermochemistry: Energy Flow and Chemical Change*; p. 235

◇ Unit 4. Thermodynamics: Entropy & Free Energy

- 4.1- Creation of entropy
- 4.2- Thermodynamic potentials
- 4.3- Thermochemical tables: entropies and Gibbs energies of formation
- 4.4- Fundamentals of chemical equilibrium
- 4.5- Shift in the chemical equilibrium

References:

Chapter 20. *Thermodynamics: Entropy, Free Energy and Direction of Chemical Reactions*; p. 880

Chapter 17. *Equilibrium: The Extent of Chemical Reactions*; p. 737

◇ Unit 5. Electrochemistry

- 5.1.- Writing and balancing redox equations
- 5.2.- Electrochemical cells
- 5.3.- Nernst equation and its applications
- 5.4.- Electrochemical processes in batteries

5.5.- Corrosion

References:

Chapter 21. *Electrochemistry: Chemical Change and Electrical Work*; p. 922

◇ Unit 6. Atomic Structure and Periodicity

6.1- Electromagnetic radiation

6.2- Wave-particle duality

6.3- Electronic configuration of hydrogen-like atoms: Quantum rules and atomic orbitals

6.4- Electronic configuration of polyelectronic atoms: Periodic classification of the elements

6.5- Periodicity of some atomic properties

References:

Chapter 7. *Quantum Theory and Atomic Structure*; p. 268

Chapter 8. *Electron Configuration and Chemical Periodicity*; p. 302

◇ Unit 7. Molecular Structure and Bonding

7.1- Nature and characteristics of chemical bonding

7.2- Lewis theory of bonding

7.3- Valence shell electron pair repulsion (VSEPR) theory (aka Gillespie-Nyholm theory)

References:

Chapter 9. *Models of Chemical Bonding*; p. 340

Chapter 10. *The Shape of Molecules*; p. 377

Department of Chemistry and Biochemistry at the University of Windsor
Guidelines for Examinations, Assignments and Laboratory Reports

Cheating and Plagiarism

1. During an examination, students must not have in their possession any unauthorized books, notes, or extraneous material, unless permitted by the instructor.
2. All incidents of cheating and plagiarism will be reported by the instructor directly and immediately to the Departmental Head for consideration of disciplinary action as delineated in Senate By-law 31.

Calculators

1. Students may only use calculators approved by the Faculty of Science and/or their instructors. Programmable calculators and calculators with infra-red transmission capability are not permitted.

Absence

1. Attendance of laboratories and mid-term examinations is MANDATORY.
2. Students who miss a mid-term examination or laboratory must provide written documentation to justify an absence. Unexcused absences or incomplete laboratory reports will result in a grade of incomplete, which in turn will result in a grade of incomplete for the course.
3. Such a student should call the departmental office 253-3000 x3521 to report his/her name and the examination missed within 24 hours of the exam.
4. Written documentation justifying the absence must be presented within 48 hours of the examination or as soon as possible. Medical excuses must be supplied using the departmental form found on the course or departmental website.
5. Excuses will not be accepted after a student has taken an examination.

Midterm examination

1. Only examinations written in non-erasable ink will be considered for a grade appeal.
2. All grade appeals must be accompanied with a written rationale for the grade appeal. Requests such as "see question xx" contain insufficient information and will not be considered for a grade appeal.
3. All grade appeals must be made either within five working days after the examination is returned to the class, or by a date designated by the professor.

Laboratory Reports/Assignments

1. Plagiarism is defined in section 2.4.22 of the University Calendar. Students are reminded that copying laboratory reports and assignments constitutes plagiarism. When two or more laboratory reports/assignments containing substantially identical material are submitted, a grade of 0 will be assigned to each student, and the incident will be reported to the Department Head.

Final Examinations

1. A student may inspect his/her own corrected final examination.
2. All posted final grades are unofficial, and non-negotiable.
3. Students who wish a formal appeal of their final examination/grade as described in section 2.6 of the Calendar may complete the appropriate paperwork at the registrar's office. In general, successful appeals will be based solely on academic merit. Grade appeals to satisfy admission or scholarship requirements or other program prerequisites will be rejected.

(These guidelines were approved by the Departmental Council on 19 Dec. 1996; updated Sep. 2003)