



**GRANDE PRAIRIE REGIONAL COLLEGE**  
**DEPARTMENT OF SCIENCE**  
**2010/2011**

CHEMISTRY 1010: Introductory University Chemistry I

CALENDAR DESCRIPTION: Lectures include stoichiometry, atomic structure and bonding, states of matter and intermolecular forces, chemistry of the elements.

OBJECTIVE: You will learn about the structure, bonding, and reactivity of chemical substances, focusing in particular on the main-group elements. By drawing and naming 3-D molecules, and then based on structure, geometry, and forces you will be able to predict reactivity and properties in the gaseous, liquid, and solid phases. You will gain an appreciation for the influence of chemistry in our lives and think critically about chemical issues.

CONTACT HOURS: 3 Lecture hours per week; 1 Seminar hour per week; 3 Laboratory hours per week; 105 hours in total

PREREQUISITE: Chemistry 30 or equivalent

TRANSFER CREDITS: CH1010 to U. of Alberta CHEM 101, 3 credits  
CH1010/1020 to U. of Calgary CHEM 201/203, 6 credits

INSTRUCTORS: A2 John Agak Office C219 539-2876  
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OFFICE HOURS: Unrestricted

TEXT BOOK: *CHEMISTRY 8<sup>th</sup> Edition*  
by Steven S. Zumdahl and Susan A. Zumdahl  
Houghton Mifflin Company ©2010

LABORATORY: Required lab manual: Introductory University Chemistry I (Chem 101 and 103), University of Alberta, 2010/2011  
**Lab coats and safety glasses are compulsory**, and are available at the Bookstore.

SEMINAR: Seminars consist of problem solving, discussion of lecture materials, and a brief introduction to the upcoming Laboratory experiment. A quiz will be part of most seminars.

EXAMS: There will be two term exams. The first is held in early October; the second will be in mid November. A final exam, held in December, is scheduled by the Registrar's office.

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COURSE EVALUATION

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|                           |     |
|---------------------------|-----|
| October Exam .....        | 15% |
| November Exam .....       | 20% |
| Final Exam .....          | 38% |
| Quizzes/Assignments ..... | 5%  |
| Laboratory Reports .....  | 12% |
| Laboratory Exam .....     | 10% |

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| Alpha Grade | Approximate Percentage Conversion |
|-------------|-----------------------------------|
| A+          | 90-100                            |
| A           | 85-89                             |
| A-          | 80-84                             |
| B+          | 76-79                             |
| B           | 73-75                             |
| B-          | 70-72                             |
| C+          | 67-69                             |
| C           | 64-66                             |
| C-          | 60-63                             |
| D+          | 55-59                             |
| D           | 50-54                             |
| F           | 0-49                              |

Assignments will be distributed on a weekly basis; complete solutions will be available in an electronic format. Completion of assignments is strongly recommended to succeed in the course.

Attendance to all lectures and seminars is strongly recommended. Laboratory attendance to each specific experiment is compulsory; a passing grade in the laboratory component is required to pass the course. A doctor's medical note is required for **all** excused absences!

Students must obtain an overall average of 50% or better to pass the course. Students are encouraged to participate in class discussions, and help is available outside the classroom. **Appointments are not necessary.**

Please see GPRC's Academic Regulations and Student Conduct statements (pages 41 to 50 of the 2010-2011 Calendar). In particular, note that cheating and plagiarism are considered to be very serious academic offences. According to GPRC policy (see page 45 of the 2010-2011 calendar), a repeat final examination will not be granted in this course.

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CH1010 COURSE CONTENT

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- A:** Matter and Stoichiometry (Review) Chapters 1, 2, 3, 4, and 20 Pages 1–179, and 907–952
- A.1 Units, dimensional analysis
  - A.2 Periodic Table
  - A.3 Naming simple compounds
  - A.4 The mole
  - A.5 Empirical and molecular formula of a compound
  - A.6 Calculations involving a limiting reagent
  - A.7 Aqueous solutions and molarity
  - A.8 Precipitation, acid/base, redox reactions
- B:** Atomic Structure Chapters 2 and 7 Pages 39–57 and Pages 284–338
- B.1 Introduction to Atomic Structure
  - B.2 Electromagnetic radiation
  - B.3 Atomic spectra and the Bohr model
  - B.4 Quantum mechanics and the atom
  - B.5 Orbital shapes and energies
  - B.6 Many-electron atoms
  - B.7 Building of the periodic table
  - B.8 Trends in atomic properties
- C:** Chemical Bonding Chapters 8 and 9 Pages 339–437
- C.1 Types of chemical bonds and electronegativity
  - C.2 Ionic bonding
  - C.3 Lattice energy
  - C.4 Covalent bonding
  - C.5 Bond energies and chemical reactions
  - C.6 Lewis structures; octet rule, resonance, formal charge, exceptions
  - C.7 VSEPR theory and molecular shape
  - C.8 Hybridization
  - C.9 Molecular orbital theory
- D:** States of Matter Chapters 5 and 10 Pages 180–234 and Pages 438–496
- D.1 Intermolecular forces
  - D.2 Gases
  - D.3 Liquids, solutions
  - D.4 Solids
  - D.5 Changes of state, phase diagrams
- E:** Chemistry of the Main Group Elements Chapter 20 Pages 907–952
- E.1 Metals *vs.* Non-metals
  - E.2 Acid base properties of oxides
  - E.3 Oxidizing and reducing agents