



CHEM 101
General Chemistry I
Fall 2009

LECTURE AND LABORATORY INSTRUCTOR: Dr. Ross Gilmore

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Moodle access : <http://moodle.ambrose.edu/course/index.php>

LECTURE AND LAB SCHEDULE:

Lecture:

Wednesday and Friday 2:30 pm — 3:45 pm Room: A2145

Lab:

Monday 1:00 – 3:45 pm Room: A2151

REQUIRED TEXTS:

- I. *Chemistry: Matter and It's Changes* – by Brady and Senese 5th Ed, Wiley Press
- II. *Laboratory Manual: Selected Laboratory Experiments*. This manual is an Ambrose University Publication and will be used as a guide and resource through the laboratory component of the course. Availability will be discussed during the first lecture.

REQUIRED MATERIALS:

Lab coat, lab notebook, lab glasses/goggles, scientific calculator.

SUPPLEMENTARY MATERIALS:

Your text is the same as that used by the University of Calgary for their equivalent course, Chemistry 201. Their website is:

<http://www.chem.ucalgary.ca/courses/f08/chem201/>

You may find links at this site to be very helpful.

RECOMMENDED TEXTS:

- I. *Math Review Toolkit* by Long and Long, or, any other math review booklet that is relevant to the sciences (especially chemistry and physics).

PRE-REQUISITES:

An absolute requirement of Chemistry 20/30 and Mathematics 20/30 or their equivalents. Mathematics 251 (Calculus I) is a suggested Co-requisite but neither differentiation nor integration will be encountered in this course. A large component of calculus, however, is algebra. An understanding of basic algebra will be required.

COURSE OVERVIEW:

General Chemistry I introduces students to the study of nature from both an atomic and a molecular perspective. The course carries on from Chemistry 20 and Chemistry 30 offered in Alberta High Schools. We examine; the content of chapters 7, 8, 9, 11, 13 and 22 of your text, Chemistry – Matter and It's Changes. Earlier Chapters focus on materials covered during high- school. As such, they are not addressed in this or the subsequent course, General Chemistry II. Instead, students are encouraged to use these earlier chapters for review as needed. Some topics covered in this course were, however, encountered during high school but will be presented here in greater detail. Some sections in the assigned chapters will be omitted.

Topics to be taught include; The Electromagnetic Spectrum, quantum mechanical atomic models, chemical bonding, molecular structure, liquid/solid properties, kinetics of chemical reactions and an introduction to organic chemistry. A detailed lecture schedule can be found in table 1 of this outline.

COURSE OBJECTIVES:

Upon completion of the course, students will have acquired the background knowledge required to move forward into General Chemistry II.

This includes an understanding of the fundamental concepts of chemistry, acquisition of basic chemistry language skills, and an experience with chemical problem solving.

I hope that you will also come to appreciate the importance of chemistry as a tool for understanding the complexity and beauty of life processes and of our environment.

It has been my experience that many students entering General Chemistry are in their 1st year of undergraduate studies. Upon entry into University or College, they are often surprised to find that primary responsibility for their education has shifted from the teacher to themselves. The University Instructor has become a facilitator of the student's education rather than a designated tutor. I have discovered that some students may have initial difficulties transitioning to this novel mode of learning.

To succeed in chemistry you are advised to read relevant topics in your text the day before or morning of your chemistry lectures. An experienced student will also review their notes within several hours of the lecture to shift acquired knowledge from short to long-term memory. In addition, since chemistry involves problem solving, you must practice these skills by completing the questions at the end of each chapter.

Keep in mind that the World Wide Web is also an excellent source of review content and practice exercises.

EVALUATION:

Assignments and In-Lab Lecture-based Quizzes	10%
Midterm Exam #1	10%
Midterm Exam II	15%
Laboratory	30%
Final Exam	35%

A passing level of performance in the laboratory is a requirement for completion of the course. Your grade in the lab is at the discretion of your lab instructor.

To pass the lecture component of the course a student must attain a minimum of 50%. To move on to courses for which this course is a pre-requisite, a C-grade (60%) is required.

LETTER GRADE GUIDELINE

Percentage (%)	Grade	Grade Point
86-100	A	4.0
80-85	A-	3.7
78-79	B+	3.3
74-77	B	3.0
70-73	B-	2.7
68-69	C+	2.5
64-67	C	2.0
60-63	C-	1.7
56-60	D+	1.5
50-55	D	1.0
0-49	F	0

Table 1: TENTATIVE LECTURE SCHEDULE:

Students are expected to review chapters 1 to 6 of their text within the first two weeks of lectures. Topics covered in those six chapters encompass a partial review of Chemistry 20 and 30. Their content will be briefly revisited in the lectures but it is expected that students are entering the course with a basic knowledge of chemistry. There is not sufficient time to cover these sections in detail. Nonetheless, you must know this material to understand the rest of the course.

Week Starting, monday	Text Sections	Lecture Topics	Lab Topics
Sept. 7 th	7.1, 7.2	Orientation, electromagnetic spectrum, atomic spectrum of hydrogen, Rydberg equation	No Labs
Sept 14 th	7.2, 7.3, 7.4	Bohr atom model, failure of Bohr model, wave functions, Orbital theory	Dry lab 1: Check In Orientation, WHMIS Session and Safety Quiz
Sept. 21 st	7.5, 7.6, 7.7, 7.8,	Periodic table trends, ionisation energy, electron affinity	Wet Lab 1: Redox titrations between oxalate and permanganate ions
Sept 28 th community day on wednesday sept 30 th	8.1, 8.2	Ionic bonds, lattice energies, Lewis symbols,	Dry Lab 2: quiz 1, tutorial (Quantum theory)
Oct. 5 th	8.3, 8.4, 8.5, 8.6	Covalent bonding, octet rule, multiple bonds, partial charges, electronegativity, reactivity series, Lewis structures, formal charges	Wet Lab 2: Titration and gravimetric analysis
Oct. 12 th (Thanksgiving day holiday on monday)	8.6, 8.7	Resonance, octet-rule-exceptions, bond length, bond order, and energy of bonds	Dry Lab 3, Quiz #2, Tutorial, Lewis structures
Oct. 19 th (thursday Oct 22 nd is a community day)	9.1, 9.2, 9.3, 9.4	1st midterm, in class Wednesday October 21st. VSEPR theory and shapes of molecules	Wet Lab 3: An investigation of atomic spectra
Oct. 26 th	9.5, 9.6, 9.7,	Hybridization of orbitals, multiple bonds (double/triple)	Dry Lab 4, Quiz #3, Tutorial, VSEPR problems
	9.7, 9.8, 11.1, 11.2, 11.3,	Molecular orbital theory, de-localized bonding and bond order . Solids, liquids, and gas states.	Wet Lab 4: An investigation of periodic trends
Nov. 2 nd	11.4, 11.5, 11.6, 11.7	Forces between molecules, liquid properties, states of matter, phase	Dry Lab 5: Quiz #4, tutorial, MO theory

		changes	
Nov. 9 th (remembrance day holiday on Wednesday, the 11th)	11.9, 11.10, 11.11, 11.12,	Phase diagrams and changes. Chemistry of materials.	Wet Lab 5: Qualitative analysis for anions and cations
Nov. 16 th	13.1, 13.2, 13.3, 13.4	2nd Midterm in class Friday Nov 20th ; Chemical Kinetics, reaction rates, rate laws, 1 st , 2 nd , and zero-order,	Dry Lab: Quiz #5, tutorial, states and phase changes
Nov. 23 rd	13.5, 13.6, 13.7, 13.8	Pseudo-order kinetics, Activation Energy, effect of temperature on rxn rates, mech's of rxns, Catalysts, enzymes, and reactions	Wet Lab 6: Investigating the kinetics of a reaction
Nov. 30 th	22.1, 22.2, 22.3, 22.4	Organic Chemistry; functional groups, nomenclature, chemistry of groups	No more labs
Dec 7 th thursday is the last day of classes	22.5, 22.6, 22.7	more functional group chemistry and polymers	
Dec 14 th to 18 th		Final Exams TBA	

LAB SAFETY:

Lab coats and goggles are mandatory. You **must** abide by the regulations outlined in your lab manual. Proper handling and disposal of chemicals is important to protect both the environment and your fellow students. Every chemical used in the laboratory comes with a WHMIS sheet. If uncertain regarding risks, ask your lab instructor, and/or refer to the WHMIS information sheet. Be familiar with all safety equipment and emergency exits within the lab. Hair should be tied back, no open shoes/sandals, avoid wearing contact lenses. Always be attentive and anticipate the risks associated with the lab procedure in progress.

**Note: You must pass the safety quiz covered during the first lab to progress onward.*

Policy Statement on Lab Attendance: Each lab session builds upon those coming before it. Consequently, failure to attend any one session poses a safety risk to the individual and to other students in the group. Therefore, students who miss one or more laboratory sessions in a course may be required to withdraw from that course.

ACADEMIC REGULATIONS:

Attendance at lectures and labs is mandatory.

Instructor's Attendance Policy:

Students are expected to attend all classes and laboratories. Unexcused absence may result in loss of marks or in additional assignments being required. Absence from class not satisfactorily validated by the course instructor may lead to a penalty on the final grade. When possible, students should advise their instructor of anticipated absence from class.

A student may be denied permission to write the final examination on the recommendation of the instructor pending approval of the Deans Council. Grounds for such debarment are: failure to

complete a substantial part of the written assignments for a course; frequent absence from class; or failure to complete a sufficient amount of the required practical or laboratory work in a course.

Students must familiarize themselves with College Academic Policies (page 71 to 83 of the academic calendar) and penalties for plagiarism and other forms of academic dishonesty (page 79).

Ambrose University Policy: Quote (Academic Calendar, 2008/2009)

33. Academic Dishonesty

Academic dishonesty is taken seriously at Ambrose University College as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty.

33.1 Plagiarism

Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person's ideas or words.

Plagiarism includes, but is not limited to

- *submitting work previously submitted in another course without the consent of the instructor;*
- *representing the words, ideas, or work of another as one's own in any academic exercise;*
- *conducting any act that defrauds the academic process.*

Nearly all forms of plagiarism can be avoided by giving credit to others whenever using

- *another person's idea, opinion, or theory;*
- *any facts, statistics, graphs, drawings –any pieces of information – that are not common knowledge;*
- *quotations of another person's actual spoken or written words;*
- *a paraphrase of another person's spoken or written words.*

33.2. Cheating

Cheating is a serious form of academic dishonesty. Cheating includes, but is not limited to

- *sitting for an examination by surrogate or acting as a surrogate;*
- *tampering or attempting to tamper with examinations, grades, or class records;*
- *communicating with another student during an examination in a dishonest way;*
- *bringing into an examination any textbook, note book, paper, information or electronic device not authorized by the instructor or examiner;*
- *consulting any person or materials outside the examination room without permission to do so;*
- *attempting to read other students' examination papers.*

34. Penalties and Procedures for

Academic Dishonesty

If an instructor finds there is sufficient evidence of academic dishonesty on the part of a student, the student will be subject to penalty. Any form of academic dishonesty may result in a zero grade on the assignment, loss of credit in that course, suspension, or other administrative action.

All cases of academic dishonesty will be reported to the Deans' Council. Where there is reason to believe a student is in violation of an academic standard outlined in the academic policies, the following process will be in effect:

Normally, the respective faculty member will deal with the matter, although the appropriate Academic Dean may be involved at the request of the faculty member. Faculty members have the authority and responsibility to assess penalties for academic dishonesty, which will normally be an 'F' on the work so compromised.

In any event, the matter will be reported to the Deans' Council, and a written record will be kept of the violation in the student's permanent file, a copy of which will be sent to the student.

The Deans' Council has the authority to impose any penalty considered appropriate for the infraction. The most severe penalty imposed will be a recommendation to the President that the student be dismissed from University College. The Deans' Council will communicate its decision to the student in writing.

Students whose cases have been referred may appear before the Deans' Council to present their case, but must leave while the Council is deliberating and arriving at a decision. Whenever students appear to present their case before an individual or committee, they may bring one other person who is able to support them in some way. However, this person may not be professional legal counsel.

Classroom Policies:

Questions are encouraged. Participation in classroom discussions is expected. If a point requires clarification, feel free to interject. Exceptions to this open lecture policy will occur when or if the time available to cover a topic is limited.

No cell phones or MP3 players are to be turned on during lectures. Phones should also be out of site and off your desk. Use of camera phones, digital cameras, recording devices, or laptop cameras is prohibited without prior permission from your instructor. Repeat offences may result in expulsion from the class.