DEPARTMENT OF SCIENCE

CHEMISTRY 1030 (Fall 2008)

INSTRUCTOR:	Dr. Som K. Pillay (Office: J210; Tel: 539-2985)
PREREQUISITE:	CHEM 30 or equivalent and MATH 30 & 31 or equivalent (ENGINEERING STUDENTS ONLY)
COREQUISITE:	MATH 1000 or equivalent
TRANSFER CREDITS:	U. of Alberta: CHEM 103, 4.3 Credits U. of Calgary: ENGG 201, 3 Credits
LECTURES:	Mondays & Wednesdays 8:30 - 9:50 A.M. (J 203)
SEMINARS:	Tuesdays & Thursdays 1:00 - 1:50 P.M. (J 203)
LABORATORY:	Fridays 2:30 - 5:20 P.M. (J 119)
TEXT BOOKS:	Steven S. Zumdahl, *Chemical Principles*, Fifth Edition, Houghton Mifflin Company, 2005.
LABORATORY ITEMS:	*Chemistry 103, Laboratory Experiments*, 2008 - 2009 Edition, University of Alberta, 2008. A Hard-Covered Laboratory Notebook, Lab Coat, and Safety Glasses.
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Web Pages:	*http://blackboard.gprc.ab.ca/*

COURSE EVALUATION

THEORY:

Assignments /Quizzes:	*10.0 %*
Mid-Term Examinations	*25.0 %*
Final Examination (Week of December 8):	*50.0 %*
	85.0 %

Notes: ***1.*** *Mid-term examination may be scheduled in the evenings or weekends.*

2. *Students must obtain a minimum of 50 % in the **t**heory Component to pass the course. There will be no supplemental or re-examination.*

LABORATORY:

General Competence in the Laboratory, Experimental Results, Lab Reports, and Lab Quizzes:	*9.0 %*
Lab Exam:	*6.0 %*
	15.0 %

Note: *Students must obtain a minimum of 50 % in the laboratory component to pass the course.*

Descriptor	Grade	Points	Descriptor	Grade	Points
Excellent 84 – 100%	*A+*	*4.0*	***Satisfactory 60 – 71 %***	*C+*	*2.3*
	A	*4.0*		*C*	*2.0*
	A-	*3.7*		*C-*	*1.7*
Good 72 – 83 %	*B+*	*3.3*	***Poor***	*D+*	*1.3*
	B	*3.0*	***Minimal Pass***	*D*	*1.0*
	B-	*2.7*	***Fail***	*F*	*0*

Note: *Other institutions may not consider grades of D sufficient to award transfer credit.*

COURSE OUTLINE

EMPHASIS IS PLACED ON UNDERSTANDING OF PRINCIPLES AND THE ABILITY TO USE PRINCIPLES TO SOLVE PROBLEMS.

1. REVIEW

Approximately two weeks of lectures and two weeks of seminars. The following chapters are relevant, and the material should be known from Chem 30.

Chapters: *2. Atoms, Molecules, and Ions*
3. Stoichiometry
4. Types of Chemical Reactions and Solution Stoichiometry
Appendix *1. Mathematical Procedures*
2. Units of Measurement

Problem Set: 1

2. QUANTUM THEORY AND ATOMIC STRUCTURE

Electromagnetic Radiation, Black Body Radiation, Photoelectric Effect, Bohr Model, Hydrogen Spectrum, The de Broglie Hypothesis, The Heisenberg Uncertainty Principle, The Schrodinger Wave Equation, Orbitals and Quantum Numbers, The Pauli Exclusion Principle, Hund's Rule, Electron Configuration, Periodic Properties.

Chapter: 12, Problem Set: 2

3. CHEMICAL BONDING AND MOLECULAR STRUCTURE

Ionic Bonds, Energetics of Ionic Crystals, Covalent Bonds, Electronegativity, Dipole Moments, Molecular Orbitals, Hybridization, Resonance, Lewis Structures, Molecular Geometry, Intermolecular Forces.

Chapters: 13 & 14, Problem Set: 3

4. PROPERTIES OF GASES

Ideal Gases, Dalton's Law of Partial Pressures, Kinetic Theory of Gases, Effusion and Diffusion, Van der Waals Equation of State, Critical Phenomena.

Chapter: 5; Problem Set: 4

5. LIQUIDS AND SOLIDS

Intermolecular Forces; Structures, Properties, and Bonding; Changes of State; Phase diagrams.

Chapter: 10; Problem Set: 5

6. CHEMISTRY OF THE ELEMENTS

Acids and Bases: Definitions, Nomenclature, structure and reactivity; Inorganic and Organic Acids.

Hydrogen, Alkali metals, Alkaline Earth metals, and p-Block Elements.

Chapters: 14, 18 & 19; Problem Set: 6

LECTURE SESSION

Regular attendance of lectures/seminars is essential to achieve a good understanding of the course material. You are encouraged to ask questions and to participate in class discussions. Help is also available outside the classroom. ***NO APPOINTMENTS ARE NEEDED.***

TENTATIVE LECTURE SCHEDULE

WEEK OF	*MONDAY*	*WEDNESDAY*	*TUESDAY/THURSDAY (Tutorial)*
Sept. 1	-	-	*Introduction*
8	*Stoichiometry*	*Stoichiometry*	*Stoichiometry*
15	,,	,,	,,
22	*Atomic Structure*	*Atomic Structure*	*Atomic Structure*
29	,,	,,	,,
Oct. 6	*Bonding & Structure*	*Bonding & Structure*	***Midterm Exam***
13	***No Classes***	,,	,,
20	,,	,,	,,
27	..	,,	*Bonding & Structure*
Nov. 3	*Gases*	*Gases*	,,
10	***No Classes***	,,	***Midterm Exam***
17	*Gases*	*Liquids and Solids*	*Liquids and Solids*
24	*Liquids and Solids*	*Liquids and Solids*	,,
Dec. 1	*Representative elements*	*Representative elements*	*Review*
8	*	***FINAL EXAM***	*

READING AND PROBLEM ASSIGNMENTS

Problem solving is an essential part of this course. It will guide your study in the right direction and also will help you to monitor your performance in the course.

Approximately ten questions will be assigned as homework every week. However, you are encouraged to solve as many additional problems as you can. It is important that you work out these problems independently. Seek help with the ones you cannot solve yourself. Unless instructed otherwise, assignments are due on Mondays, Wednesdays, and Fridays at 8:30 AM. ***NO LATE ASSIGNMENTS ARE ACCEPTED. DON'T ASK!***

LABORATORY SESSION

Laboratory sessions start at 2:30 P.M. sharp. All students are expected to come to the laboratory well prepared for the experiment that is to be performed and on time. At the start of each lab period you will be given a 15-minute quiz.

Students are expected to attend all laboratory periods. Absences due to illness must be substantiated by presenting suitable evidence to the Instructor/Lab Technician within one week of missing the lab. An opportunity to make up a lab will be given only for ***excused absences****.*

The laboratory experiments are designed to allow a well-prepared student to finish all the work within the allotted time. ***IT IS YOUR RESPONSIBILITY TO COMPLETE THE LAB ON TIME.***

Students are responsible for keeping the lab tidy. Failure to keep the workbench and common areas tidy will result ***in demerits up to 5 marks*** *each lab period.*

LABORATORY REPORT

You must record everything you do and observe as you carry out your experiment. Use a hardcover laboratory notebook for this purpose. Do not copy the procedure from the laboratory manual. Keep your notebook neat. Your notebook will be checked periodically.

Formal lab reports should be written using the format given in your laboratory manual. Unless instructed otherwise, the lab reports are due at the end of the lab. ***NO LATE LAB REPORTS ARE ACCEPTED.***

TENTATIVE LABORATORY SCHEDULE

Date	***EXPERIMENT****
Sept. 12 & 19	*1. Check-In: Lab and Safety Orientation*
Sept. 26 & Oct. 03	*2. Stoichiometry*
Oct. 10 & 17	*3. Compounds of Copper*
Oct. 24 & Oct. 31	*4. . Analysis of Vitamin C*
Nov. 7 & 14	*5. Bonding & Chemical Properties*
Nov. 21 & 28	*6.* Lab Exam and Check-Out

****TEXT: Chemistry 103, Laboratory Experiments, 2008 – 2009 Edition, University of Alberta, 2008.***

Back to the Top

Send mail to *spillay@gprc.ab.ca* with questions or comments about this web site.

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