



**Grande Prairie
Regional College**

Department of Science

LRC

CHEMISTRY 1030 (Fall 1992)

INSTRUCTOR: Dr. Som K. Pillay
(Office: E 309; 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 & FRIDAYS
10.00 - 10.50 AM (J 201)

SEMINARS: TUESDAYS & THURSDAYS
1.30 - 2.50 AM (J 202)

LABORATORY: TUESDAYS
3.00 - 5.50 PM (J 119)

TEXT BOOKS AND LABORATORY ITEMS: Modern University Chemistry, Norbert T. Porile, HBJ Publishers, 1987.

How to Solve General Chemistry Problems, 7th Ed., R. S. Boikess and C. H. Sorum, Prentice-Hall Inc., 1987 (Optional).

Chemistry 103, Laboratory Experiments, University of Alberta, 1992

Lab Coats and Safety Glasses

COURSE EVALUATION

Assignments/Quizzes	12.5 %
Lab Reports/Lab Quizzes	12.5 %
Mid-Tem Examinations	30.0 %
Final Examination	45.0 %
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	100 %

Note: A pass Grade is essential for the Laboratory Component.

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 1. The Basic Constituents of Matter
2. Chemical Equations and Stoichiometry
10. Thermochemistry, Section 10.7 to 10.10

Problem Sets: 1 & 2

2. PROPERTIES OF GASES

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

Chapters: 3 & 4; Problem Sets: 3 & 4

3. APPLICATIONS OF EQUILIBRIUM:

A. General: Gas Phase Equilibria, Heterogeneous Equilibria, Le Chatelier's Principle

Chapter: 7; Problem Set: 5

B. ACID-BASE EQUILIBRIA: Review of Fundamentals, Bronsted-Lowry Acid-Base Theory, The Lewis Theory, Dissociation Constant, Levelling Effect, pH of simple and Complex Acids and Bases in Water, Indicators, Titration Curves, Buffer Solutions, Hydrolysis, Polyprotic Acids

Chapter: 8; Problem Sets: 6 & 7

C. IONIC EQUILIBRIA: Solubility of Ionic Compounds, K_{sp} , Common-Ion Effect, The Effect of Complexing Ligands, The Effect of pH on Solubility Equilibria, Selective Precipitation of Ions, Extraction and Separation

Chapter: 9; Problem Set: 8

6. THERMODYNAMIC PROCESSES AND THERMOCHEMISTRY:

Reversible and Irreversible Processes, Internal Energy, PV Work, The First Law of Thermodynamics, Heat capacity, Enthalpy, Processes Involving Ideal Gases, Thermochemistry, The Carnot Cycle, Heat Engines & Refrigerators.

Chapter: 10; Problem Sets: 9 & 10

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 class room. NO APPOINTMENTS ARE NEEDED.

TENTATIVE LECTURE SCHEDULEFALL SEMESTER

WEEK OF	MONDAY	WEDNESDAY	FRIDAY	TUE./THU. (Tutorial)
Sept. 2		Intro- duction	Stoichio- metry	Study Skills
7	NO LECTURE	Stoich.	,,	Stoich.
14	Stoich.	,,	,,	,,
21	Gases	Gases	Gases	Gases
28	,,	,,	,,	,,
Oct. 5	Equilibria	Equilibria	Equilibria	EXAM I
12	NO LECTURE	Acids & Bases	Acids & Bases	Equilibria
19	Acids & Bases	,,	,,	Acids & Bases
26	,,	,,	,,	,,
Nov. 2	,,	Ionic Equilibria	Ionic Equilibria	Ionic Equilibria
9	Ionic Equilibria	NO LECTURE	Thermo- dynamics	EXAM II
16	Thermo- dynamics	Thermo- dynamics	,,	Thermo- dynamics
23	,,	,,	,,	,,
30	Thermo- Dynamics	REVIEW	REVIEW	REVIEW
Dec. 7	REVIEW	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 home work 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 Fridays at 10.00 AM. NO LATE ASSIGNMENTS ARE ACCEPTED. DON'T ASK!

FALL SEMESTER

PROBLEM SET #	CHAPTER*	PROBLEMS
1	1	31 & Questions 1-14, Pages 8-9
2	2	14, 23, 30, 33 & Questions 15-25, Pages 9-10
3	3	3, 14, 19, 22, 24 & Questions 1-8, Pages 11-12
4	3 4	23, 32 & Questions 9-17, Pages 12-13 19
5	7	9, 12, 14-16, 22, 24, 26, 27, 29 & Questions 1-3, Page 14
6	8	16, 18, 21, 22 & Questions 1-12, Page 15
7	8	29, 31, 46 & Questions 13-26, Pages 15-17
8	9	8, 9, 11, 18, 19, 21, 23 a & b, 26, 30 & Questions 1-5, Page 17
9	10	15, 18, & Questions 1-10, Pages 18-19
10	10	26, 28, 30 & Questions 11-21, Pages 19-21

*TEXT: Modern University Chemistry, Norbert T. Porile, HBJ Publishers, 1987.

LABORATORY SESSION

Laboratory sessions start at 3.00 PM sharp. All students are expected to come to the laboratory well prepared in the experiment that is to be performed and on time.

Students are expected to attend all laboratory periods. Absences due to illness must be substantiated by presenting suitable evidence to the Instructor/Lab Technician. 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.

LABORATORY REPORT:

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

Formal lab reports should be written using the format given in your laboratory manual. The lab reports are due on Fridays at 4.30 PM. NO LATE LAB REPORTS ARE ACCEPTED.

TENTATIVE LABORATORY SCHEDULE

WEEK OF	EXPERIMENT*
Sept. 15 & 22	* Check-In *
Sept. 29 & Oct. 6	AA Reactions of Copper
Oct. 13 & 20	BB Ideal Gas Constant
Oct. 27 & Nov. 3	DD Titration of Acids & Bases
Nov. 10 & 17	EE Titration Curves
Nov. 24 & Dec. 1	CC Enthalpy of Reaction

*TEXT: Chemistry 103, Laboratory Experiments, University of Alberta, 1992