GRANDE PRAIRIE REGIONAL COLLEGE

DEPARTMENT OF SCIENCE

CHEMISTRY 200 Fall 91

INSTRUCTOR	*Dr. Dave Wanigas*	
	Room: J207	
Telephone	*Office*	539 2004
	Residence	538 3859
PREREQUISITES	CHEM 30	MATH 30
TRANSFER CREDITS	*University of Alberta*	6 Credits

TEXT BOOK: **CHEMISTRY** *Second Edition*

AUTHOR: Stephen. S. Zumdahl

D. C. Heath and Company, Lexington, Mass; Toronto

LABORATORY MANUAL:

University of Alberta Chemistry 200/202 Laboratory Experiments

Lab Coats are **compulsory** and are available at the Book store.

Safety Glasses are compulsory and available in the Laboratory. Room F 129.

A LABORATORY BREAKAGE DEPOSIT OF $30.00 HAS TO BE PAID TO THE CASHIER. SHOW THE RECIEPT DURING THE FIRST LABORATORY SESSION FOR ADMITTANCE

COURSE EVALUATION

		MARKS
1.	First Midterm Exam Week of Oct. 23 - 27	10
2.	Christmas Examination	20
3.	Second Midterm Exa Week of Feb 19 - 23	10
4.	April Final Examination	30
5.	Laboratory Reports	20
6.	Assignment,	5
7.	Quizzes	5
	TOTAL	100

The two midterm examinations will be of 2 hour duration. The Christmas and the April Final Examination will be three hours.

Assignments will be handed out every week and are due the following Monday. Late assignments will not be accepted. Quizzes will be given as required after every chapter during the Seminar Hours. Attendance to CLASSES and SEMINARS are STRONGLY RECOMMENDED.

Laboratory attendance is compulsory. A passing grade in the Lab is required to pass the course.

A student is required to obtain an average of 50% to pass the course.

SYLLABUS

FALL SEMESTER September 5 to December 10, 1991

1.0 REVIEW

[A] CHEMICAL FOUNDATIONS

(i) Scientific Method
(ii) Units of Measurement
(iii) Significant Figures and Calculations
(iv) Dimension Analysis
(v) Temperature, Density, etc

CHAPTER 1 pages 1 - 23

[B] STOICHIOMETRY

(i) Atomic Masses, The Mole
(ii) Molecular Weight, Molar Mass
(iii) Percentage Composition of Compounds
(iv) Determining the Formula of a Compound
(v) Stoichiometric Calculations
(vi) Calculations Involving Limiting Reagents

CHAPTER 3 Pages 73 - 110

[C] SOLUTION STOICHIOMETRY

(i) The Nature of Aqueous solutions
(ii) The Concept of Molarity
(iii) Composition of Solutions
(iv) Precipitation Reactions
(v) Limiting Reagents in Aqueous Reactions

(vi) Simple Acid Base Reactions
(vii) Simple Acid Base Reactions involving Stoichiometry.

CHAPTER 4 pages 119 - 145

2.0 GASES

(i) Early Experiments
(ii) Tha Gas Laws of Boyles, Charles and Avogadro
(iii) Gas Stoichiometry
(iv) Daltons's Law of Partial Pressures
(v) Effusion and Diffusion
(vi) Real Gases

CHAPTER 5 pages 176 - 207

3.0 BONDING AND STRUCTURE

A ATOMIC THEORY

(i) Daltons Atomic Theory
(ii) Early Experiments to Characterize the Atom
(iii) Modern View of Atomic Structure: An Introduction
(iv) Electromagnetic Radiation
(v) The Atomic Spectrum of Hydrogen
(vi) The Wave Mechanical Model of the Atom
(vii) The Bohr Model
(viii) The Wave Mechanical Model of the Atom
(ix) Quantum Numbers
(x) Orbital Shapes and Energies
(xi) Electron Spin and Pauli Principle
(xii) Polyelectron Atom
(xiii) The Aufbau Principle and the Periodic Table
(xiv) Periodic Trends in Atomic Properties

CHAPTER 2 Pages 38 - 56

CHAPTER 7 Pages 264 - 310

B STRUCTURE AND BONDING

(i) Types of Chemical Bonds
(ii) Electronegativity
(iii) Bond Polarity and Dipole Moments
(iv) Ion: Electron Configuration and Sizes
(v) Formation of Binary Ionic Compounds
(vi) Partial Ionic Character of Covalent Bonds
(vii) The Localized Electron Bond Model
(viii) Lewis Structures and the Octet Rule
(ix) Exceptions to the Octet Rule
(x) Resonance
(xi) Valence Shell Electron Pair Repulsion, VSEPR, Model
(xii) Hybridization and the Localized Electron Model
(xiii) The Molecular Orbital Model

CHAPTER 8 Pages 323 - 375

CHAPTER 9 Pages 383 - 400

4.0 CHEMICAL EQUILIBRIUM

(i) The Equilibrium Condition
(ii) The Equilibrium Constant
(iii) Equilibrium Expression Involving Pressures
(iv) Heterogeneous Equilibria
(v) Le Chateliers Principle
(vi) Solving Equilibrium Problems and Applications of the Equilibrium Constant

CHAPTER 13 Pages 567 - 601

WINTER SEMESTER

CHEMISTRY 200 Jan 6 - April 16, 1992

5.0 ACID BASE EQUILIBRIA

A ACIDS AND BASES

(i) Acids and Bases: Introduction
(ii) Acidity and the pH Scale
(iii) Calculation of pH of Strong and Weak Acid and Bases
(iv) Bases and the concept of pOH
(v) Polyprotic acids
(vi) Acid Base properties of Salts.
(vii) Solutions of Acids or Bases Containing a Common Ion. (*The Common Ion Effect*)
viii) Buffers and Buffer Capacities
(ix) Calculations involving Buffers
(x) Acid Base Titrations and pH Curves
(xi) Problems involving Titrations
(xii) Acid base Indicators

B SOLUBILITY EQUILIBRIA

(xiii) Solubility Equilibria and the Solubility Product
(xiv) Complex Ion Equilibria
(xv) Precipitation and Qualitative Analysis
(xvi) Problems involving Precipitation and Qualitative Analysis

CHAPTER 14 pages 609 - 657

CHAPTER 15 Pages 669 - 730

6.0 CHEMICAL THERMODYNAMICS

A FIRST LAW OF THERMODYNAMICS

(i) Enthalpy and Calorimetry
(ii) Hess's Law
(iii) Standard Enthalpies of Formation
(iv) First Law of Thermodynamics

CHAPTER 6 Pages 222 - 253

B ENTROPY FREE ENERGY AND EQUILIBRIUM

(i)Energy and Spontaneity: The need for a Second Law
(ii) Reversible Processes
(iii) Derivation of the Reversible Work of Expansion of an Ideal Gas
(iv) Maximum Work
(v) The entropy change for an isothermal process
(vi) The Second Law of Thermodynamics
(vii) Gibbs Free Energy Function
viii) Calculation of ΔG
(ix) ΔG^{o} and the equilibrium Constant
(x) The Temperature Dependance of ΔH, ΔS, ΔG and K_{eq}.

CHAPTER 16 Pages 738 - 770

This Chapter Will be Supplemented with Extensive Notes

7.0 ELECTROCHEMISTRY

(i) Galvanaic Cells
(ii) Standard Reduction Potentials
(iii) Cell Potential, Electrical Work and Free Energy
(iv) Electrolysis.
(v) Application of Electrolysis and the Galvanaic Cell

CHAPTER 17 Pages 779 - 814

8.0 CHEMICAL KINETICS

(i) Reaction Rates
(ii) Rate Laws: Introduction
(iii) The Integrated rate Law
(iv) Reaction Mechanism

CHAPTER 12 pages 515 - 552