GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE AND TECHNOLOGY
2003/2004

CHEMISTRY 2710:	Chemical Thermodynamics — Energetics of Chemical Reactions
PREREQUISITE:	CHEM 1020 or equivalent and MATH 1130 or equivalent
INSTRUCTOR:	Les Rawluk Office J214 539-2738
TEXT BOOK:	Physical Chemistry, 7th Edition. by P.W. Atkins and J. de Paula
LABORATORY ITEMS:	Chemistry 271 Laboratory Manual University of Alberta, 2003 Lab coats and safety glasses Hard cover Physics Laboratory Note Book

COURSE EVALUATION

Midterm Exam	20%
Final Exam	45%
Assignments	10%
Lab Reports	15%
Lab Exam	10%

CH2710 COURSE OUTLINE

I. Gases

- Equations of state, Ideal Gas Law, Dalton's Law of Partial Pressures
- Temperature and the Zeroth Law of Thermodynamics
- Kinetic Molecular Theory and the its Basis for the Ideal Gas Law
- Nonideal Gases, the Van der Waals Gas

II. The First Law of Thermodynamics

- Work, Heat, Energy, State Functions and Exact Differentials
- Stating the First Law
- Enthalpy, Heat Capacity, Thermochemistry, Calorimetry
- Bond Enthalpies, Born-Haber Cycle, Solubilities of Ionic Salts
- Temperature dependence of Enthalpy
- Work, Heat, Energy changes in Processes Involving Gases

III. The Second and Third Laws of Thermodynamics

- Entropy and the Direction of Spontaneous Change, Interconversion of Heat and Work
- Stating the Second Law
- Entropy Changes in Reversible and Irreversible Processes
- Conditions for Equilibrium
- Standard Entropies and the Third Law of Thermodynamics
- Gibbs Energy, Helmholtz Energy, Chemical Potential, Maxwell Relations

IV. Chemical Equilibrium

- Equilibria Involving Ideal and Nonideal Gases, Gas Fugacity, Activity and the Chemical Potential
- Solution Equilibria, Solute and Solvent Activities
- Heterogeneous Equilibria, Activities of Solids and Liquids
- Temperature and Pressure Dependence of Equilibrium Constants

V. Phase Equilibria

- Pure Substances: Gas-Liquid, Gas-Solid, Liquid-Solid Equilibria
- Ideal Solutions of Non-electrolytes, Enthalpy and Entropy of Mixing, Raoult's Law, Henry's Law, Boiling Point Elevation, Freezing Point Depression
- Phase Diagrams for One and Two Component Systems