GRANDE PRAIRIE REGIONAL COLLEGE DEPARTMENT OF SCIENCE AND TECHNOLOGY 2005/2006

CHEMISTRY 3730 Physical Chemistry — Physical Properties and Dynamics of Chemical Systems 3(3-1-3)

CONTACT HOURS: 3 Lecture hours per week; 1 Seminar hour per week; 3 Laboratory hours per week; Total of 105 contact hours

PREREQUISITE: CH3710 or equivalent

INSTRUCTOR: Les Rawluk Office J214 539-2738

EMAIL: lrawluk@gprc.ab.ca

WEBSITE: http://blackboard.gprc.ab.ca

- OFFICE HOURS: Unrestricted
 - TEXT BOOK: Physical Chemistry by K.J. Laidler, J.H.Meiser, B.C.Sanctuary Houghton Mifflin Company ©2003
 - LABORATORY Required: <u>Chemistry 373 Laboratory Manual</u> University of Alberta, 2005 Lab coats and safety glasses Hard cover Physics Laboratory Note Book A Laboratory Breakage Deposit of \$30 per Chemistry course must be paid to the Cashier (Room C315), and the receipt must be shown to the Laboratory Technician (Mrs. Omana Pillay) during the first Laboratory class.

SEMINAR: Seminars consist of problem solving and discussion of lecture materials.

COURSE EVALUATION

Midterm Exam	20%
Final Exam	5%
Assignments	0%
Laboratory Reports	5%
Laboratory Exam1	.0%

Alpha Grade	Approximate Percentage Conversion
A+	90-100
A	85-89
A-	80-84
B+	76–79
В	73–75
B-	70–72
C+	67–69
C	64–66
C-	60–63
D+	55 - 59
D	50 - 54
F	0-49

Attendance to all lectures and seminars is strongly recommended. Laboratory attendance to each specific experiment is compulsory; a passing grade in the laboratory component is required to pass the course. A doctor's medical note is required for **all** excused absences!

Students must obtain an overall average of 50% or better to pass the course. Students are encouraged to participate in class discussions, and help is available outside the classroom. Appointments are not necessary.

CH3730 course outline

I. Colligative Properties

• Boiling point elevation, freezing point depression, and osmotic pressure

II. Ionic Solutions

- Conductance, molar conductivity,
- Weak electrolytes, strong electrolytes
- Drift speed, ion mobility, ion conductivity
- Thermodynamic functions of formation, activity coefficients
- Ionic equilibria

III. Electrochemical Cells

- Standard potentials, measurement of activity coefficients
- Thermodynamic functions from cell potential measurements

IV. Kinetic Molecular Theory

- Gas pressure, Maxwell-Boltzmann distribution
- Collision frequency, mean free path, collision density
- Gas imperfections

V. Transport Properties

• Fick's first law

VI. Chemical Kinetics

- Differential and integrated rate laws
- Experimental methods and techniques
- Influence of temperature
- Collision theory and transition state theory
- Composite mechanisms, consecutive reactions
- Rate constants and equilibrium constants
- Free radical reactions
- Catalysis

VII. Surface Chemistry

- Adsorption, adsorption isotherms
- Chemical reactions on surfaces, surface structure, surface tension
- Surfactants
- Colloids