GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE AND TECHNOLOGY
2004/2005

CHEMISTRY 2730	Physical Chemistry — Physical Properties and Dynamics of Chemical Systems
CONTACT HOURS:	3 Lecture hours per week; 1 Seminar hour per week; 3 Laboratory hours per week; Total of 105 contact hours
PREREQUISITE:	CH2710 or equivalent
TRANSFER CREDITS:	CH2730 to U. of Alberta CHEM 273, 3 credits CH2710/2730 to U. of Calgary CHEM 371, 3 credits
INSTRUCTOR:	Les Rawluk Office J214 539-2738
EMAIL:	lrawluk@gprc.ab.ca
WEBSITE:	http://blackboard.gprc.ab.ca
OFFICE HOURS:	Unrestricted
TEXT BOOK:	Required: *Physical Chemistry* by David W. Ball Nelson Thomson Learning ©2003
LABORATORY	Required: Chemistry 273 Laboratory Manual University of Alberta, 2004 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	45%
Assignments	10%
Laboratory Reports	15%
Laboratory Exam	10%

Alpha Grade	Approximate Percentage Conversion
A+	90–100
A	85–89
A−	80–84
B+	76–79
B	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.**

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
- Diffusion
- Gas imperfections

V. 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

VI. Surface Chemistry
- Adsorption, adsorption isotherms
- Chemical reactions on surfaces, surface structure, surface tension
- Surfactants
- Colloids