

**Department of Chemistry and Biochemistry**  
**Chemistry 59-240: Introductory Physical Chemistry I**  
***General Information***

**Professor:** Dr. Rob Schurko  
**Office:** 393 Essex Hall  
**Email:** rschurko@uwindsor.ca  
**Website:** <http://mutuslab.cs.uwindsor.ca/schurko/introphyschem/>  
**Teaching Assistant:** Mr. Greg Davidson  
**Email:** davids1@uwindsor.ca

**Lectures:** MWF 9:30-10:20 1121 Education Bldg.  
**Tutorials:** Mon. & Thurs. 2:30-3:50 2137 Erie Hall  
**Assignments:** Handed out every second Friday, due the following Friday

**A. Instructional Materials**

Introductory Physical Chemistry I (59-240) follows "Physical Chemistry - 6th Edition" by P.W. Atkins, which is available at the University of Windsor Bookstore. Below is a recommended list of texts and "equipment" which will be useful in this course.

***Textbooks:***

1. Atkins, P.W. Physical Chemistry, 6th Edition. W.H. Freeman & Co., New York, 1998.
2. Atkins, P.W. Solutions Manual to Accompany Physical Chemistry, 6th Edition. W.H. Freeman & Co., New York, 1998.
3. Barrante, J.R. Applied Mathematics for Physical Chemistry, 2nd Edition. Prentice Hall, Upper Saddle, NJ, 1998.

***Miscellaneous:***

1. Scientific Calculator
2. Web access

**B. Course Objectives**

1. To provide the student with an understanding of the principles, laws, and theories of physical chemistry.
2. To develop in the student the ability to solve quantitative problems.
3. To promote original thought on the part of the student and encourage the use of logic in the solution of problems.
4. To develop an ability in the student to learn and work independently.

**C. Tutorials/Laboratories**

The purpose of these sessions will be to review material previously covered, and to assist in the solution of assigned homework problems (though not the questions on the assignments). No new material will be introduced. It is recommended that you attend to benefit from the experience of your teaching assistant!!

**Department of Chemistry and Biochemistry**  
**Chemistry 59-240: Introductory Physical Chemistry I**  
**Course Outline**

Below is an outline of the material to be covered over the course of the semester, and corresponding chapters in P.W. Atkins' "Physical Chemistry - 6th Edition". We will cover most of Chapters 1-8 of P.W. Atkins, 6th edition, as an introduction to **Chemical Thermodynamics**.

0. Introduction to Physical Chemistry
1. The Properties of Gases.
2. The First Law of Thermodynamics: Concepts
3. The First Law of Thermodynamics: Machinery
4. The Second Law of Thermodynamics: Concepts
5. The Second Law of Thermodynamics: Machinery
6. Physical Transformations of Pure Substances
7. Simple Mixtures
8. Phase Diagrams

**Lecture Schedule - Fall 2001**

<b>Chapt.</b>	<b>Lecture Subject</b>
0	Course Introduction, Physical Chemistry in Context, SI Units
1.1	States of Gases
1.2	Gas Laws
1.3	Kinetic Model of Gases
1.4-1.6	Real Gases: Molecular Interactions, van der Waals equation
2.1	Introduction to Thermodynamics: Work, Heat and Energy
2.2	The First Law of Thermodynamics
2.3-2.4	Work and Heat
2.5-2.6	Enthalpy and Adiabatic Change
2.7-2.9	Thermochemistry: Enthalpy
3.1	First Law of Thermodynamics: State Functions
3.2-3.3	Temperature Dependence of Enthalpy, $C_v$ and $C_p$
4.1-4.2	Second Law of Thermodynamics, Intro to Entropy 4
4.2-4.5	Entropy (cont'd), Third Law of Thermodynamics
4.6-4.7	Helmholtz and Gibbs Energies

### Lecture Schedule Fall 2001 (continued)

5.1	Properties of Internal Energy 5
5.2	Properties of the Gibb's Energy
5.3-5.6	Chemical Potential, Fugacity, Standard States
6.1-6.2	Phases and Phase Boundaries
6.3	Phase Diagrams
6.4	Phase Stability and Transitions
6.5-6.7	Location of Phase Boundaries
6.8-6.10	Liquid Surfaces
7.1-7.2	Partial Molar Quantities, Thermodynamics of Mixing
7.3	Chemical Potentials of Liquids
7.4-7.5	Liquid Mixtures, Colligative Properties
7.6-7.7	Solvent and Solute Activity
8.1-8.2	Phase Diagrams & Phase Rule
8.3-8.4	Vapour Pressure Diagrams
8.4-8.5	Liquid-Liquid Phase Diagrams
8.6	Liquid-Solid Phase Diagrams

### *Important Dates*

<b>Date</b>	<b>Event</b>	<b>Comment</b>
Friday, September 7, 2001	First 59-240 Class	9:30 1121 Education
Monday October 8, 2001	Thanksgiving Day (No Classes)	
Wednesday October 17, 2001	Mid-term #1 (20%)	Regular Class Slot
Wednesday, October 31, 2001	Voluntary Withdrawal Deadline	
Wednesday November 21, 2001	Mid-term #2 (20%)	Regular Class Slot
Wednesday, December 5, 2001	Last Day of Classes	
Friday, December 7, 2001	Final Examination (50%)	Exam Slot 5

**Department of Chemistry and Biochemistry**  
**Chemistry 59-240: Introductory Physical Chemistry I**  
***Marking Scheme***

**Mark Breakdown:**

Mid-term 1	20%	Wed., Oct. 17, 2001
Mid-term 2	20%	Wed., Nov. 21, 2001
Assignments	10%	
Final Exam	50%	Fri., Dec. 7, 2001 (Exam Slot 5)

**Letter Grades:**

93-100 A+	87-92.9 A	80-86.9 A-
76-79.9 B+	73-75.9 B	70-72.9 B-
66-69.9 C+	63-65.9 C	60-62.9 C-
56-59.9 D+	53-55.9 D	50-52.9 D-
36-49.9 F	0-35.9 F-	

***More About the Course***

A. Attendance is VERY IMPORTANT to be successful in this course. **You must keep up with the material as the semester progresses.**

B. The student should bring his/her textbook, lecture notebook, and all necessary material to each class meeting.

C. The student MUST study outside of class. Outside work should include reading assigned material, doing assigned questions and problems, reviewing lecture notes, correcting errors made in past work, etc. For every 1 hour of lecture, 2-3 hours should be spent outside of class.

**Physical chemistry requires study, practice and drill.**

D. Adequate lecture notes should be taken. These notes should be reviewed as soon as possible after each class meeting. **The student is encouraged to consult with the instructor about any material that is unclear. Lectures will also be available on the web as they are produced.**

E. Exams missed due without an official excused absence will result in a grade of zero. Only students with an official excused absence will be given the opportunity to make-up an exam.

F. All students are required to take the final examination in order to receive a passing grade in the course. No notebooks, texts or cheat sheets are allowed in the examination or mid-terms. Students caught cheating will receive an automatic grade of zero.