Administrative Unit: Science Department

Course Prefix and Number: PHYS 401

Course Title: Introduction to Physical Chemistry/Chemical Physics

**DIGITAL DESCRIPTIONS**

<table>
<thead>
<tr>
<th>STUDENT DESCRIPTION:</th>
<th>PAY-HOUR DESCRIPTION:</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cr Hrs - # Lec Hrs - # Lab Hrs</td>
<td>Total # = Lec Hrs + Lab Hrs</td>
</tr>
<tr>
<td>3 - 3 - 0</td>
<td>3 = 3 + 0 X 2/3</td>
</tr>
</tbody>
</table>

Catalog Description: Introduction to quantum mechanics, and atomic and molecular spectroscopy. Topics include kinetic theory of gases, gas laws, and thermodynamics. Cross-listed as CHEM 401. Students majoring in Chemistry must earn a grade of C or better. Offered even Spring.

Prerequisites/Corequisites: PHYS 111 and 111L; PHYS 112 and 112L or PHYS 211 or 212; MATH 201; CHEM 210 and 210L; or instructor's permission. Equivalent courses may be substituted for the courses specified.

Suggested Text:
- Physical Chemistry. Vemulapalli.
- Physical Chemistry. Levine.
- Physical Chemistry. Mortimer

Course Objectives: Students will demonstrate familiarity with different properties of gases, fundamentals of thermodynamics, change of state, equilibrium, electrochemistry, basic quantum chemistry, and atomic and molecular spectra.

Topical Outline: Properties of Gases; The laws of thermodynamics—detailed discussions; Changes of state; Physical transformation of pure materials and simple mixtures, the phase rule; Equilibrium electrochemistry: ions and electrodes; Introduction to Quantum Chemistry: Principles, techniques, and applications; and Atomic and Molecular Spectroscopy—different atom models and their importance, introduction to the hydrogen atom—Born-Oppenheimer approximation, etc.
Recommended maximum class size for this course: 25

Prepared by: Melanie Hoffmann

Name  Signature

Date: October 9, 2003

**NOTE:** The intention of this master course syllabus is to provide a general outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught, or where it is taught. This _generic_ outline is not intended to restrict the way any individual faculty member teaches the course. The master syllabus, therefore, should be general enough to allow for a diversity of individual approaches to teaching the course, while at the same time it provides guidance on what the course should cover.