METROPOLITAN STATE COLLEGE *of* DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Letters, Arts & Sciences

Department: Chemistry

CIP Code: 40.0506

Prefix & Course Number: CHE 3260 **Crosslisted With*:** _____

Course Title: Physical Chemistry II

Check All That Apply: Required for Major: x Required for Minor: _____ Specified Elective: _____

Required for Concentration: _____ Elective: _____ Service Course: _____

Credit Hours: 4 (4+0)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture 60 Lab _____ Internship _____ Practicum _____ Other (please specify type and hours):_____

Schedule Type(s): L **Grading Mode(s)**: L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

_____

** **NOTE: This information must be included in the course description.**

Restrictions (Variable Topics Course): None

Prerequisite(s): CHE 3250, PHY 2020 or PHY 2331

Corequisite(s): None

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:
Prerequisite(s): x
Corequisite(s): x
Prerequisite(s) or Corequisite(s): x

Catalog Course Description:

This course is a comprehensive study of the principles of quantum mechanics, quantum chemistry, atomic structure, molecular structure, symmetry, spectroscopy. Literature searches related to historical and current topics in chemistry will be required.

APPROVED: Charles A Tindall 10/7/05
Department Chair ~~OR~~ Program Director Date

Hal Lamsy 11/15/05
Dean **OR** Associate Dean Date

Linda S. Curran 2/06/06
Associate VP, Academic Affairs Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number: CHE 3260

Required Reading and Other Materials will be equivalent to:
Physical Chemistry, 4th edition, K.J. Laidler, J.H. Meiser, B.C. Sanctuary, Houghton Mifflin Company, 2003

Specific, *Measurable* Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:

1. Explain the relation of quantum theory to real phenomena.
2. Given appropriate data calculate quantum states and parameters for simple systems such as the particle in a box, harmonic oscillators, rigid rotors.
3. Derive and calculate quantum states and parameters for hydrogen atoms and hydrogen like atoms.
4. Interpret atomic spectra.
5. Use molecular orbital theory to calculate parameters such as bond order, electron density and stability.
6. Use symmetry to predict dipole movements and optical activity.
7. Interpret pure rotational spectra of simple molecules.
8. Interpret vibration-rotation spectra of simple molecules.
9. Conduct an advanced literature search

Detailed Outline of Course Content (Major Topics and Subtopics) **or Outline of Field Experience/Internship (experience, responsibilities and supervision)** (format: I, A, 1, a, etc.):
1. Quantum Theory: Introduction and Principles
2. Quantum Theory: Techniques and Applications
3. Atomic Structure and Atomic Spectra
4. Molecular Structure
5. Symmetry: Its Description and Consequences
6. Rotational and Vibrational Spectra
7. Electronic Transitions
8. Chemical Literacy

Evaluation of Student Performance (format: 1, a, i, ii, etc.):
Students will be given periodic examinations. These examinations will be supplemented by homework assignments. A final exam will terminate the course. The final grade determination will be based on the student's performance on the examinations, homework, and the final exam.