FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: CHM 4411
COURSE TITLE: Physical Chemistry II
PREREQUISITE(S): CHM4410 (Physical Chemistry I) with a grade of “C” or better
COREQUISITE(S):
CREDIT HOURS: 3
CONTACT HOURS/WEEK: 3
CONTACT HOUR BREAKDOWN:
Lecture/Discussion: 3
Laboratory:
Other __________:
FACULTY WORKLOAD POINTS: 3
STANDARDIZED CLASS SIZE ALLOCATION: 35

CATALOG COURSE DESCRIPTION:

This course will cover the foundations of quantum mechanics, spectroscopy, chemical bonding and intermolecular forces, and photochemistry with an emphasis on how these principles apply to protein structure and folding and other biological macromolecules and processes.

SUGGESTED TEXT(S):
Chang, Raymond, Physical Chemistry for the Biosciences, University Science Books, Latest edition
SUGGESTED TEXT(S):


Chang, Raymond, Physical Chemistry for the Chemical and Biological Sciences, University Science Books, Latest edition


Engel, Thomas, Reid, Philip, Physical Chemistry, Prentice Hall, Latest edition

IMPLEMENTATION DATE: Fall Term, 2011 (20121)

REVIEW OR MODIFICATION DATE:
COURSE TOPICS                                             CONTACT HOURS
                                           PER TOPIC
I.    Introduction                                           1

II.   Quantum Mechanics                                      12
    a.  Blackbody Radiation and the Photoelectric Effect
    b.  Particle-Wave Duality
    c.  Planck, Einstein, Bohr, de Broglie, Heisenberg, Schrodinger, etc.
    d.  Particle in a 1D Box

III.  Spectroscopy                                          8
    a.  The Harmonic Oscillator and Rigid Rotator
    b.  The Hydrogen Atom and Molecule
    c.  Absorption and Emission Spectroscopies
    d.  Microwave, Infrared, Visible, UV, Fluorescence, Phosphorescence, etc., Spectroscopies

IV.   Chemical Bonding                                      10
    a.  Lewis Structures
    b.  Valence Bond Theory
    c.  Electronegativity and Polarization
    d.  Molecular Orbital Theory
    e.  Diatomic Molecules
    f.  Resonance and Electron Delocalization

V.    Intermolecular Forces                                 8
    a.  Intermolecular Interactions and their types
    b.  Hydrogen Bonding
    c.  Water
    d.  Hydrophobic Interactions

VI.   Photochemistry                                        6
    a.  Primary versus Secondary Processes
    b.  Photosynthesis
    c.  Vision

Total Lecture Hours: 45
## Section 1

**COURSE PREFIX AND NUMBER:** CHM 4411  
**SEMESTER CREDIT HOURS (CC):** 3  
**CONTACT HOURS (NCC):**  
**COURSE TITLE:** Physical Chemistry II

## Section 2

**TYPE OF COURSE:** (Click on the box to check all that apply)  
- AA Elective  
- AS Required Professional Course  
- College Prep  
- AS Professional Elective  
- AAS Required Professional Course  
- Technical Certificate  
- Other  
- B.S. Biomedical Sciences Upper Division Core Course  
- PSAV  
- Apprenticeship  
- General Education: (For General Education courses, you must also complete Section 3 and Section 7)

## Section 3 (If applicable)

**INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:**  
- Communications  
- Social & Behavioral Sciences  
- Mathematics  
- Natural Sciences  
- Humanities

## Section 4

**INTELLECTUAL COMPETENCIES:**  
- Reading  
- Speaking  
- Critical Analysis  
- Quantitative Skills  
- Scientific Method of Inquiry  
- Writing  
- Listening  
- Information Literacy  
- Ethical Judgment  
- Working Collaboratively

## Section 5

**STATE GENERAL EDUCATION LEARNING OUTCOME AREA**  
- Communication  
- Critical Thinking  
- Scientific and Quantitative Reasoning  
- Information Literacy  
- Global Sociocultural Responsibility

## Section 6

**LEARNING OUTCOMES**  
<table>
<thead>
<tr>
<th>Type of Outcome: Gen. Ed, Program, Course</th>
<th>METHOD OF ASSESSMENT</th>
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<tbody>
<tr>
<td>Demonstrate knowledge of quantum mechanics, spectroscopy, and chemical bonding</td>
<td>Course</td>
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<tr>
<td>Demonstrate knowledge of intermolecular forces</td>
<td>Course</td>
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<td>Demonstrate knowledge of photochemistry</td>
<td>Course</td>
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<tr>
<td>Demonstrate the application of interdisciplinary natural science curricula to biomedical sciences.</td>
<td>Program</td>
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<td>Task</td>
<td>Discipline</td>
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<td>Conduct an experiment, collect and analyze data, and interpret results in a laboratory setting</td>
<td>Discipline</td>
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<td>Analyze, evaluate, and test a scientific hypothesis</td>
<td>Discipline</td>
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<td>Use basic scientific language and processes and be able to distinguish between scientific and non-scientific explanations</td>
<td>Discipline</td>
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<tr>
<td>Identify unifying principles and repeatable patterns in nature, the values of natural diversity, and apply them to problems or issues of a scientific nature</td>
<td>Discipline</td>
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**Section 7**

Name of Person Completing This Form: Stephen Lukacs, Ph.D.  
Date: December 17, 2010