

University of Arkansas - Fort Smith  
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## General Syllabus

### CHEM 4514 Physical Chemistry II

Credit Hours: 4

Lecture Hours: 3

Laboratory Hours: 3

Prerequisites: CHEM 1413/1411 College Chemistry II/Laboratory and PHYS 2923/2931 University Physics II/Laboratory

Effective: 2018~2019

#### I. Course Information

##### A. Catalog Description

Topics include quantum mechanics, atomic and molecular structure, the periodic table, chemical bonding, and kinetics. Course will be offered every other year; consult your faculty advisor.

##### B. Additional Information - None

#### II. Student Learning Outcomes

##### A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Evaluate and describe the laws of quantum mechanics.
2. Analyze and apply the Schrodinger equation to chemical problems.
3. Describe the structure of atoms and molecules using the mathematical concepts of quantum mechanics.
4. Calculate physical properties from spectroscopic analysis.
5. Apply kinetic models to describe chemical reactions.

##### B. University Learning Outcomes

Physical Chemistry II enhance student abilities in the following areas:

##### Analytical Skills

**Critical Thinking Skills:** Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues.

Students will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

**Communication Skills (written and oral)**

Students will communicate proficiently. Students will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

**Ethical Decision Making**

Students will model ethical decision-making processes. Students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

**Global & Cultural Perspectives**

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. Students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

**III. Major Course Topics**

- A. Quantum Mechanics
- B. Atomic and Molecular Structure
- C. Chemical Bonding
- D. Spectroscopy
- E. Kinetics
- F. Periodic Table