Minnesota State University Moorhead

CHEM 460: Physical Chemistry: Quantum Chemistry & Kinetics

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: *.*

Prerequisites:
MATH 262 - Calculus II AND CHEM 210 - General Chemistry II AND PHYS 161 - College Physics II & Lab; OR
PHYS 201 - General Physics II & Lab

Corequisites: None

MnTC Goals: None

Application of physics and mathematics to chemical phenomena, focusing on quantum chemistry, spectroscopy, and kinetics.

B. COURSE EFFECTIVE DATES: 09/06/2018 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Basic principles of quantum mechanics
2. Atomic electronic structure
3. Molecular electronic structure and computational chemistry
4. Spectroscopy
5. Chemical kinetics
6. Statistical mechanics

D. LEARNING OUTCOMES (General)

1. Explain the principles and probabilistic nature of quantum mechanics.
2. Describe solutions to the Schrödinger equation for a variety of chemical and physical systems.
3. Apply molecular orbital theory via computational chemistry to chemical systems of interest.
4. Interpret and calculate molecular properties from molecular spectra.
5. Describe the factors influencing the rate of a chemical reaction, and relate rate laws to mechanisms.
6. Describe how the microscopic properties of atoms, molecules, and ions yield observable macroscopic properties.
7. Use the techniques of calculus to solve chemical problems.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted