Minnesota State University Moorhead

CHEM 300: Inorganic Chemistry I

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: *.*

Prerequisites:
CHEM 210 - General Chemistry II

Corequisites: None

MnTC Goals: None

Aspects of bond theory, periodicity, acid-base chemistry, redox chemistry, reaction kinetics, energetics and chemistry of the elements.

B. COURSE EFFECTIVE DATES: 05/19/1998 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Wavefunctions and probability functions of atomic orbitals
2. Shielding and Slater¿s Rules
3. Hydration and hydrolysis of cations and anions
4. Classification of acidity of cations and basicity of monatomic anions
5. Classification of ligands, chelate and macrocyclic effects
6. Covalent bonds and periodicity of bond energy
7. Crystal field theory of octahedral, tetrahedral, square planar and distorted geometries
8. Crystal field theory: magnetic properties, spectra and other consequences of CFT
9. Extracting elements from their ores, Pourbaix diagrams
10. Hard and soft acid-base principle
11. Lattice energy, radius ratios and lattice types
12. Lewis acid/base concept and complex ions
13. Nomenclature of inorganic compounds
14. Periodicity in the activity of metals and redox chemistry of nonmetals
15. Solubility rules for salts of oxo anions
16. Stability of lattices and solubility rules
17. Standard reduction potentials, redox predominance diagrams
18. Structures, formulas and basicity of oxo anions and their conjugate acids
19. Thermodynamics of solubility: Entropy and Enthalpy of precipitation

D. LEARNING OUTCOMES (General)

1. Predict the solubility of any inorganic compound and will be able to explain the solubility using thermodynamic principles.
2. Understand the periodicity in redox behavior of the elements and will be able to predict redox reactions.
3. Understand why the acidity and basicity of a number of classes of inorganic compounds varies as it does and will be able to predict the chemical consequences of this variation.
4. Understand why the elements exist in various broad classes of compounds and will be able to predict the common chemical form of an element in nature.

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted