HIBBING COMMUNITY COLLEGE
COURSE OUTLINE

COURSE TITLE & NUMBER: Introduction to Chemistry: CHEM 1020
CREDITS: 4 (3 Lec/1 Lab)
PREREQUISITES: MATH 0971: Beginning Algebra, or MATH 0983: Intermediate Algebra or equivalent

CATALOG DESCRIPTION:
This course is an introduction to chemistry for students who have never taken a chemistry course. Topics include measurement, energy, atomic structure, chemical bonds, chemical reactions, stoichiometry, nuclear chemistry, gases, solutions, acids and bases and organic chemistry. Introduction to Chemistry is intended for non-science majors and may serve as a prerequisite for General Chemistry. May not be taken for credit if student has already completed CHEM 1300 or equivalent.

OUTLINE OF MAJOR CONTENT AREAS:
1. Measurement
   A. Units
   B. Prefixes
   C. Dimensional analysis
   D. Significant figures
   E. Density
2. Energy and matter
   A. Energy
   B. Temperature
   C. Measuring heat energy
   D. States of matter
   E. Changes of state
3. Nuclear chemistry
   A. Natural radioactivity
   B. Nuclear equations
   C. Radioactive isotopes
   D. Radiation detection and measurement
   E. Nuclear fission and fusion
4. Atoms and elements
   A. Elements and symbols
   B. Atomic structure
   C. Periodic table
   D. Electron configurations
5. Chemical bonds
   A. Valence electrons
   B. Octet rule
   C. Ionic compounds
   D. Covalent compounds
6. Chemical quantities and reactions
   A. Balancing chemical equations
   B. Stoichiometry

7. Gases
   A. Properties of gases
   B. Gas laws

8. Solutions
   A. Aqueous solutions
   B. Formation of ionic solutions
   C. Factors affecting solubility
   D. Percent composition
   E. Molarity
   F. Normality
   G. Colloids and suspensions

9. Acids and bases
   A. Electrolytes
   B. Acid/base definitions
   C. Acid/base strength
   D. Neutralization
   E. pH
   F. Buffers
   G. Titration

10. Introduction to organic chemistry
    A. Organic compounds
    B. Structural isomers
    C. IUPAC nomenclature system
    D. Organic functional groups
    E. Organic reactions
    F. Polymers

COURSE GOALS/OBJECTIVES/OUTCOMES:
1. Students will use the metric system and learn the basics of unit conversion using dimensional analysis.
2. Students will understand the basics of energy in chemical reactions as well as in nutrition.
3. Students will understand the atomic theory of matter as well as the main features and nomenclature of ionic and molecular compounds.
4. Students will understand the various nuclear decay modes as well their rates, and basic nuclear reactions including fission and fusion.
5. Students will understand basic concepts of chemical bonding including Lewis structures, bond polarity and electronegativity.
6. Students will balance simple chemical equations and use the concept of the mole to perform stoichiometric calculations.
7. Students will understand the various gas laws.
8. Students will describe the solution process, the factors affecting solubility, colligative properties and be able to calculate solution concentration.
9. Students will explain the concept of acids and bases including pH and buffers.
10. Students will be introduced to the basics of organic chemistry.
11. Students will perform laboratory experiments pertaining to classroom topics.

MNTC GOALS AND COMPETENCIES MET:
Natural Sciences

HCC COMPETENCIES:
Thinking Creatively & Critically

METHODS FOR EVALUATING STUDENT LEARNING:
The final grade is determined by the average of exams, lab write ups, assignments and a final exam.

ADDITIONAL INFORMATION:
Hazardous chemicals will routinely be used in laboratory. Students will be supplied with pertinent information relating to these materials at the appropriate time.

AASC APPROVAL DATE: November 15, 2017

REVIEW DATE: November 2022