

# North Hennepin Community College

## CHEM 1030: Introduction to Physical Sciences

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

In this course, students will explore the basics of chemistry and physics by examining such concepts as understanding and measuring matter; atoms, elements, compounds and mixtures; physical and chemical properties of matter; states of matter; chemistry fundamentals, the periodic table; bonding and types of compounds; mixtures and solutions; chemical reactions; properties and sources of energy; heat; electricity, circuits, and power; properties of sound & light; the behavior of sound & light; forces and motion; work and simple machines. This course is intended for students who wish to complete a science course with a lab. It is not a prerequisite for any science or health programs. This course may not be used as a substitute for a chemistry course or a physics course.

Math 0901 (Intro to Algebra) or basic math skills are highly recommended.

**B. COURSE EFFECTIVE DATES:** 01/14/2008 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Understanding and Measuring Matter
2. Atoms, Elements, Compounds and Mixtures
3. Physical and Chemical Properties of Matter
4. States of Matter
5. Chemistry Fundamentals, The Periodic Table
6. Bonding and Types of Compound
7. Mixtures and Solutions
8. Chemical Reactions
9. Properties and Sources of Energy
10. Heat
11. Electricity, Circuits, and Power
12. Properties and the Behavior of Sound & Light
13. Forces and Motion
14. Work and Simple Machines

## **D. LEARNING OUTCOMES (General)**

1. Analyze and express an opinion about current controversial topics in science like GMOs (genetically modified organisms), banning of mercury, fracking, alternate energy sources, sterilization of food by irradiation, global warming/Carbon footprint, speed limits in different states and so on. (MnTC Goal 3, comps. a, c, d; NHCC ELOs, 1, 2, 3, 4)
2. Identify states and types of matter, its properties and components at the macroscopic and microscopic level; demonstrate the ability to measure common properties of matter, infer appropriate data thus predicting behavior. (MnTC Goal 3, comps.a, b, c; NHCC ELOs 1, 2)
3. Understand the classification of elements and the relation between the classification, the properties and the sub-atomic structure. (MnTC Goal 3, comps.a,b, c; NHCC ELOs 1, 2)
4. Differentiate between the types of chemical bonding and relate the elemental structure to type of bonding. (MnTC Goal 3, comps.a,c; NHCC ELOs 1, 2)
5. Define solution, compute concentration and saturation, examine properties of a solution and relate them to pH, types of reactions and rates of reactions. (MnTC Goal 3, comps.a,b,c; NHCC ELOs 1, 2)
6. Distinguish between forms of energy, describe transformation of energy and the relationship to work using real-life examples, discuss renewable energy sources and their relevance to society. (MnTC Goal 3, comps. a, b, c; NHCC ELOs 1, 2, 3, 4)
7. Illustrate static and current electricity, electric field, conductors and insulators, fuses and circuit breakers; using Ohms law, predict electric flow in different circuits. (MnTC Goal 3, comps. a,b,c; NHCC ELOs 1, 2)
8. Compare and contrast sound and light wave forms, their components and the manner in which they travel. (MnTC Goal 3, comps. a,b,c; NHCC ELOs 1, 2)
9. Explain with examples speed, velocity, acceleration, momentum, inertia, force, Newton's three laws; compute and interpret graphs depicting speed. (MnTC Goal 3, comps.a, b,c; NHCC ELOs 1, 2)
10. Compare different types of machines and assess mechanical efficiency, power and work capacity of a simple machine; thus evaluate the type of machine to use in a specific situation. (MnTC Goal 3, comps.a, b,c; NHCC ELOs 1, 2)

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

### Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

## **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

## **G. SPECIAL INFORMATION**

1. Knowledge of Human Cultures and the Physical and Natural World - Through study in the sciences, mathematics, social sciences, humanities, histories, languages, the arts, technology and professions.
2. Intellectual and Practical Skills - Including: Inquiry and analysis; Critical and creative thinking; Written and oral communication; Quantitative literacy; Information literacy; Teamwork and problem solving.
3. Personal and Social Responsibility and Engagement - Including: Civic knowledge and involvement - campus, local and global; Intercultural knowledge and competence; Ethical reasoning and action; Foundations and skills for lifelong learning.
4. Integrative and Applied Learning - Including: Synthesis and advanced accomplishment across general education, liberal studies, specialized studies and activities in the broader campus community.