MONTGOMERY COLLEGE

DEPARTMENT OF CHEMISTRY

Common Course Outline

CHEM 109 – Chemistry and Society

Course Description

Development of an understanding of the basic principles that are the foundations of chemistry; the significance of chemistry in our society; and the application of chemistry to environmental problems such as air and water pollution, food additives, solid waste recycling, and the energy resources of the earth. Also, make risk/benefit analysis based on scientific information.

Perquisites: *A grade of C or better in MATH 080, appropriate score on the mathematics placement test, or consent of department. Assessment Level(s): ENGL 101/ENGL 101A, READ 120.*

Credits – *3 semester hours.* To satisfy the natural sciences lab distribution requirement, CHEM 109 and CHEM 109L must be taken concurrently or within one academic year.

General Education – Natural Science Distribution (NSD)

CHEM109 fulfills the Montgomery College General Education Program Natural Sciences Distribution (NSD) requirement. The General Education Program is designed to build skills, knowledge, and attitude necessary for success in work and personal life. This course provides multiple opportunities to develop two or more of the following competencies: written and oral communication, scientific and quantitative reasoning, critical analysis and reasoning, technological competency, and information literacy.

Course scheduling

Sections scheduled at Rockville and Takoma Park campuses. Distance Learning section available.

Broad Course Outcomes

Upon successful course completion, a student will be able to:

- Describe chemical and physical properties of atoms, ions, and molecules.
- Discuss topics of current social, economic, environmental and scientific interest.
- Evaluate risk-benefit decisions based on scientific information.

Specific Course Objectives

Upon successful course completion, a student will be able to:

- Identify matter as elements, compounds, or mixtures.
- Differentiate between gases, liquids, and solids.
- Use scientific measurements in chemistry calculations.
- Distinguish between physical and chemical changes and properties.
- Identify the basic components of the atom; distinguish between atoms, ions, and molecules.
- Write formulas of and names of chemical compounds; balance chemical equations.
- Define acids and bases; recognize common acids and bases and describe their uses.
- Discuss major air pollutants.

- Describe properties of water and compare wastewater treatment methods.
- Balance nuclear equations and solve simple half-life problems.
- Describe additional topics of current social and economic interest
- Make risk-benefit decisions based on scientific information.

Major Lecture Topics

Introduction to General Chemistry, sustainability, General Principles in Chemistry – Inorganic nomenclature, molecular formulas, balancing chemical equations, composition of air, air quality, electromagnetic spectrum, greenhouse gases, global climate change, unusual properties of water, water pollution and treatment techniques, acids and bases, pH scale, ocean acidification, acid rain, nuclear chemistry, radio-dating techniques, nuclear energy, combustion reactions, energy, plastics.

Course Requirements

Grading procedures will be determined by the individual faculty instructor, but will include the following *minimum* criteria:

- Minimum of three examinations
- Homework, quizzes, other assignments or projects as assigned by the instructor
- Signature General Education Assignment - Research Paper and Presentation

All students are expected to complete a Student Academic Plan for Completion (SAPC), which is a semester-by-semester outline of planned courses to satisfy a student's academic degree program.

Grading Policy

The following letter grade policy will be used to determine the final course grade:

A 100 - 90% **B** 89 - 80% **C** 79 - 70% **D** 69 - 60% **F** <60%

Textbook Information

Chemistry in Context; Applying Chemistry to Society, 9th edition, ACS. McGraw Hill Publisher.

Textbook Chapter Coverage

Chapter 1 – Portable Electronics: The Periodic Table in the Palm of Your Hand
Chapter 2 – The Air We Breathe
Chapter 3 – Radiation from the Sun
Chapter 4 – Climate Change
Chapter 5 – Energy from Combustion
Chapter 6 – Energy from Alternative Sources
Chapter 7 – Energy Storage
Chapter 8 – Water Everywhere: A Most Precious Resource
Chapter 9 – The World of Polymers and Plastics

Some textbook sections may be deleted from the above chapters and additional material from new chapters may be covered at Instructor's discretion.

Student Code of Conduct and Academic Honesty

Montgomery College Syllabus Information