



# Broward Community College

## Course Outline

STATUS:   A  

COMMON COURSE NUMBER:   CHM 1094  

COURSE TITLE:   Principles of Chemistry for Teachers II  

CREDIT HOURS:           3          

CONTACT HOURS BREAKDOWN:

Lecture/Discussion           48          

Lab   

Other   

Contact Hours/Week           3          

CATALOG COURSE DESCRIPTION:

Prerequisite: CHM 1093 or One College-Level Chemistry Course

Corequisite: None

This course is designed for middle and high school science teachers and continues the discussion of the basic principles of chemistry and the practical applications of those principles that were the focus of CHM 1093. This course will not satisfy the General Education Requirements for the A.A. degree.

General Education Requirements - Associate of Arts Degree, meets Area(s):

General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Energy Topics
2. Environmental Topics
3. Introduction to Organic Chemistry
4. Food Chemistry
5. Medicine and the Chemistry of Health

## I. Course Overview:

Upon successful completion of this course, the students should be able to demonstrate knowledge of chemical principles as applied to several practical topics.

## II. Units:

### Unit 1. Energy Topics

#### General Outcome:

1.0 The students should be able to discuss the major forms and uses of energy along with the different methods of energy production.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

1.1 Define energy and list the different forms and common units of energy.

1.2 List the three major fossil fuels, their chemical components, their relative abundance, and the major advantages and disadvantages of each.

1.3 List the major methods of energy production in the United States.

1.4 State the first and second laws of thermodynamics.

1.5 Define and correctly use these terms: endothermic, exothermic, efficiency, biomass, passive and direct solar energy.

1.6 State the relative amounts of energy generated in the United States by the different methods of energy production.

1.7 List the major areas of energy consumption in U.S. society.

1.8 Discuss energy conservation strategies in the transportation, industrial and residential sectors.

## Unit 2. Environmental Topics

### General Outcome:

2.0 The students should be able to summarize the important components of the environment, the chemicals that result in pollution, and some of the strategies needed to preserve the environment.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 List the layers and chemical components of the atmosphere.
- 2.2 List the major features of the oxygen and nitrogen cycles.
- 2.3 List the major sources and components of air pollution, both natural and person-caused.
- 2.4 Discuss the "greenhouse effect," its causes and remedies.
- 2.5 Discuss the concerns relating to the ozone layer.
- 2.6 List the components and causes of "acid rain," and discuss the various concerns related to this phenomenon.
- 2.7 Summarize and discuss general and specific methods to reduce air pollution.
- 2.8 List the unique properties of water, the many roles it plays in the environment and in society, and list the areas of major water consumption in U.S. society.
- 2.9 List the major types of water pollutants and state specific examples and sources of each.
- 2.10 Discuss the term "thermal pollution," its sources and effects.
- 2.11 List and discuss general and specific methods to reduce and treat water pollution.

### Unit 3. Introduction to Organic Chemistry

#### General Outcome:

- 3.0 The students should be able to summarize the important aspects of organic chemistry, recognize the common classes of organic compounds, and relate these concepts to familiar substances.

#### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Define organic chemistry and become cognizant of the the general occurrence of organic compounds.
- 3.2 List the unique properties of carbon that lead to its central role in organic chemistry.
- 3.3 Classify a compound as a member of one or more of the common organic groups (alkanes, alkenes, alkynes, aromatic hydrocarbons, heterocyclic hydrocarbons, alcohols, acids, aldehydes, ketones, ethers, esters).
- 3.4 Identify and give examples of compounds that are halogenated hydrocarbons, including freons.
- 3.5 State the difference between naturally occurring and synthetic organic compounds.
- 3.6 Define the term isomer and recognize examples of compounds that are isomers from their structural formulas.
- 3.7 Name and write the formula for specific simple and common organic compounds.
- 3.8 List the common types of polymers, recognize examples of each, and discuss some of their uses.

## Unit 4. Food Chemistry

### General Outcome:

4.0 The students should be able to list and discuss the major food groups in terms of their chemical composition and their general role in the human body.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

4.1 List the three main categories of foods (carbohydrates, fats, and proteins) and summarize their chemical nature and their uses in the body.

4.2 Define the terms monosaccharide, disaccharide, and polysaccharide and list and/or recognize examples of each.

4.3 List the components of sucrose, starch, and cellulose.

4.4 Summarize the different forms in which glucose is stored in the body.

4.5 State the major differences between fats and oils, and list the primary sources of each.

4.6 Summarize the important roles of proteins within the body.

4.7 List the major minerals needed by the body, their common sources, and the roles they serve in the body.

4.8 State the definition of a vitamin; list the fat soluble vitamins and the water soluble vitamins; summarize the major sources of the important vitamins and the problems that result from specific vitamin deficiencies.

4.9 State the general definition of "food additive", list the major categories of food additives, and give specific examples in each category.

4.10 State the meaning of "GRAS" as applied to food additives.

## Unit 5. Medicine and the Chemistry of Health

### General Outcome:

5.0 The students should be able to summarize the major categories of medicines and discuss the general aspects of selected chemical pathways of the brain.

### Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 5.1 List the major categories of medicines, as well as uses and examples of each.
- 5.2 State the names of the major aspirin substitutes and the advantages and disadvantages of each.
- 5.3 Discuss the differences between bacteria and viruses and the challenges they provide in disease control.
- 5.4 Define the term "vaccination" and list the types of diseases for which this strategy may be effective.
- 5.5 Discuss the major categories of anti-cancer drugs and how they work.
- 5.6 Discuss the major causes of death in the United States.
- 5.7 List the most commonly prescribed medications.
- 5.8 List and discuss the major categories of medicines that affect primarily the mind (depressants, barbituates, narcotics, anti-anxiety drugs, stimulants, amphetamines, alkaloids, mind-altering drugs).
- 5.9 Define "designer" drugs and discuss some of the concerns and danger related to them.
- 5.10 List the types of mind/mood altering drugs that the brain produces, including enkaphalins, endorphins, and neurotransmitters.
- 5.11 State how some of the major categories of anti-depressant medications work.