

Appendix C
College of Micronesia-FSM

COURSE OUTLINE COVER PAGE

Chemistry
Course Title

SC 230
Department and Number

Course Description:

The course is an investigation of the fundamentals of general chemistry and an introduction to organic chemistry. The course **will** emphasize the role of chemistry in modern human life. The laboratory supports the lecture topics, through both qualitative and quantitative experiments. The topics include: Basic concepts, chemical substances, chemical reactions, atomic structure, states of matter, and an introduction to organic chemistry.

Course Prepared by: Dr. Anca Dema **State** National Campus

| | Hours per Week | | No. of Week | | Total Hours | | Semester Credits |
|------------|----------------|---|--------------|---|-----------------|---|------------------|
| Lecture | _____3_____ | x | _____16_____ | x | _____48/16_____ | = | _____3_____ |
| Laboratory | _____3_____ | x | _____16_____ | x | _____48/16_____ | = | _____1_____ |
| Workshop | _____ | x | _____ | x | _____ | = | _____ |

Purpose of Course:

| | |
|--------------------|-------|
| Degree Requirement | _____ |
| Degree Elective | _____ |
| Certificate | _____ |
| Other | _____ |

Prerequisite Course(s): MS 098 Transition to Algebra

SA

AM. lat

James

5/1/03
Date Approved by Committee

5/2/03
Date Approved by President

COLLEGE OF MICRONESIA -FSM

I. COURSE OBJECTIVES

I.A. General Objectives:

1. To present the fundamental of chemistry in a comprehensible manner to student's with a minimal background in chemistry.
2. To strengthen the student's background in chemistry.
3. To emphasize the importance of problem solving to understanding chemistry
4. To develop the fundamental concepts from the most elementary of ideas, to emphasize the conceptual understanding.
5. To introduce every day applications of chemistry to facilitate the conceptual understanding.
7. The course serves to sharpen students skills in problem solving and critical thinking
8. To provide a solid base of fundamental laboratory techniques in chemistry, procedures and safety.
9. To enhance the student's skills of observations, interpretation of data to use the scientific method in problem solving.
10. To prepare the students for today's work environment;
11. After completing a one term chemistry course, students should be able to do the following: -read, write and talk about chemistry, using a basic chemistry vocabulary;
-write routine chemical formulas; -set-up and solve chemistry problems -"think" chemistry on an atomic or molecular level in fundamental theoretical areas-to visualize what happens in a chemical change.

II.A. Specific Objectives: The students will demonstrate understanding of the following topics: Basic Concepts, Chemical substances and chemical reactions. Atomic structure and chemical reactions, Introduction to organic chemistry, Introduction to biochemistry.

II. Course Content:

BASIC CONCEPTS-The student will be able to demonstrate understanding of the basic concepts, by solving problems correctly using processes in (1.1) to (1.2)

1. Introduction in Chemistry

1.1 The Science of Chemistry 1.2 the Scientific Method

2. Measurement in Chemistry -the student will be able to correctly solve problems with measurement in chemistry, by solving problems using processes in(2.1) to (2.6).

Metric Units

2.1 Measured Numbers and Units

2.2 Writing measurements in Scientific Notation 2.3 Units of Length, Volume and Mass

2.4 Significant Figures and Uncertainty in Measurement 2:5 Significant Figures in Arithmetic Results

2.6 Calculations

3. Matter and Energy 3.1 State of Matter 3.2 Physical and Chemical Changes and Properties 3.3 Substances and Mixtures

3.4 Elements and Compounds 3.5 Law of Conservation of Mass 3.6 Types of Energy

4. Atoms, Molecules and Ions

4.1 Dalton's Atomic Theory

4.2 Particle Structure of the Atom

4.3 Atomic Weights

4.4 Periodic Tables of the Elements Molecules and Ions

4.5. The Molecular Basis of Substances

4.6 Comparing Molecular and Ionic Substances

4.7 Molecular Substances and their Formulas

4.8 Ionic Substances and Their Formulas

4.9 Electrical Properties of Substances in Solution

II. CHEMICAL SUBSTANCES AND CHEMICAL REACTIONS

5. Chemical Formulas and Names

5.1 Formulas of Binary Ionic Compounds

5.2 Naming Binary Ionic Compounds When the Metal Forms a Single Cation

5.3 Naming Binary Ionic Compounds When the Metal Forms Several Cations

5.4 Compounds with Polyatomic Ions

Molecular Compounds

5.5 Binary Molecular Compounds

5.6 Naming Binary Acids

5.7 Naming Oxyacids

6. Chemical Reactions and Equations

Recognizing and Symbolizing Chemical Reactions

6.1 Recognizing the Chemical Reactions

6.2 Chemical Equations

6.3 Balancing Chemical Equations

Types of Chemical Reactions

6.4 Combination and Decomposition Reactions,

6.5 Single-Replacement Reactions

6.6 Double replacement Reactions

7. Chemical Composition

Molecular Weights Formula Weights and Moles

7.1 Molecular Weight and Formula Weight

7.2 The Mole

7.3 Molar Mass

7.4 Molar Mass in Calculations: Gram to Moles

7.5 Molar Mass in Calculations: Moles to Grams

7.6 Percentage Composition

8. Quantities in Chemical Reactions

8.1 Interpreting a Balanced Chemical Equation

8.2 Mole Calculations from Chemical Equations

8.3 Mass Calculations from Chemical Equations

III. ATOMIC STRUCTURE AND CHEMICAL REACTIONS

9. Electron Structure of Atoms

Energy Levels and Atomic Orbitals

9.1 Light and Other Forms of Electromagnetic Radiation

9.2 Bohr's Theory of Atom

9.3 Orbital, Electron Shells, and Subshells Electron Configurations

9.4 Electron Configurations of the first Eighteen Elements

9.5 Periodicity of Electronic Configurations

9.6 Using Periodic Table to Obtain Electron Configuration of a Main-Group Element

10. Chemical Bonding

Ionic Bonds

10.1 Forming an Ionic bond From Atoms

10.2 Describing Ionic Bond Formation by Electron-dot Symbols Covalent Bonds

10.3 Covalent Bonding as a Sharing of electron Pairs

10.4 Electronegativity and Polar Covalent Bonds

10.5 General Method of Writing Electron -Dot Formulas

IV.ORGANIC CHEMISTRY

Bonding and Structure in Organic Compounds

11.1 Carbon-Atom Bonding

11.2 Structural Formula and Isomers

Hydrocarbons

11.3 Alkanes

11.4 Alkenes and Alkynes

11.5 Polyalkene Polymers

11.6 Aromatic Hydrocarbons Oxygen Derivatives of Hydrocarbons

11.7 Alcohols

11.8 Aldehydes and Ketones

11.9 Carboxylic Acids and Esters Nitrogen Derivatives of Hydrocarbons

11.10 Amines,

11.12 Amides

V.BIOCHEMISTRY

11.13 Biological Molecules

11.14 Amino Acids

11.15 Proteins Carbohydrates

11.16 Monosaccharides and Polysaccharides Lipids

11.17 Triacylglycerols

11.18 Phospholipids

IV.METHOD OF INSTRUCTION:

Lecture; all new materials, examples, definitions will be presented sequentially. Some fundamental definitions -will be defined. The importance of learning the definitions of each new term will not be overemphasized, but the fundamental terms, that is almost impossible to grow-up today has to be emphasized. Students will solve problems in class. The lab experiments will closely related with lecture. We use models of atoms, of bonding, CD-ROM- directly tied to Introductory chemistry book, set modeled after examples from the text, tutorials, animation, videos, molecular models, overhead projections transparencies of 100 four color figures and illustrations from the text etc. The textbook is supported with a Laboratory manual, known that the chemistry is an experimental science. Each experiment is introduced with a discussion of the purpose of the lab, post lab discussions, and questions, in order to help students to evaluate their understanding of the experimental work. To achieve our goals we offer to the students many more suggestions about "Learning How to Learn", "Learn smarter not harder".

V.REQUIRED TEXTBOOK: Introductory Chemistry,2nd Ed. Darrell D. Ebbing, R. A. D. Wentworth, Houghton Mifflin Comp.N.Y,1998.

The lab Manual-Experimental General Chemistry,compiled by Dr Anca Dema,1999-Bookstore,COMFSM.

Required Materials:

1.The textbook

2.Laboratory textbook

3.Calculator

4.Computer tutorial

5.CD ROM

6.Same supplies and equipment required for chemistry lab.

VI.REFFEREENCE MATERIALS:

[1.J.Chem.Ed.-Fundamentals](#) of Inorganic Chemistry;an introductory text for degree courses studies, Jack and Munir A.Malatti,1999,Jan./abs/761-1. 2.Fundamental of Introductory Chemistry, Darell D.Ebbing, 2nd,Houghton Mifflin,Comp.Boston-New-York,1998.

2FOUNDATIONS of Chemistry,2nd Ernest R Toon, George L.Ellis, Larry Doyle. John Ivanco, Stan Percival, 2nd., 1990,Harcourt Brace &Comp., Sandiego.

3.Chemistry ,Bernice G. Segal ,1985,John Willey & Sons,Inc.

VII.EVALUATIONS: the students will be evaluated by tests quizzes, homework,homeworkstudy assignments, projects, lab report, midterm exam and final exam.

Grades: A = 90-100,B = 80-89. C = 70-79,D = 60-69,F = below 60. -NO MAKE UP TEST OR FINAL EXAM.

-CREDIT BY EXAMINATION: YES in certain circumstances.

VIII.ATTENDANCE POLYCY :The College policy will be enforced.