

PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
CREDIT COURSE NOT APPLICABLE TO THE A.A. DEGREE

(Use this form only for courses which do not apply to the A.A. Degree)

COURSE NUMBER AND TITLE: 10 – Chemistry Calculations

UNIT VALUE: 1

MINIMUM NUMBER OF SEMESTER HOURS: 16

BASIC SKILLS REQUIREMENTS: Appropriate language and computational skills.

ENTRANCE REQUIREMENTS

PREREQUISITE: None

COREQUISITE: None

RECOMMENDED PREPARATION: None

SCOPE OF COURSE:

The basic calculation skills needed for successful performance in Chem 100, 110, and 115. Areas such as significant figures, exponential numbers and basic chemical problems are discussed. Emphasizes student practice of chemistry problems. *Grading: Credit/No Credit only.*

SPECIFIC COURSE OBJECTIVES:

Successful students will be able to:

- a. Analyze a chemistry problem and setup a reasonable approach to calculating the correct answer.
- b. Identify the correct use of units in the problem-solving process.
- c. Estimate quickly approximations for the magnitude of a correct answer in given units.
- d. Evaluate word type problems and translate them into unit-identified values.
- e. Explain concentration units and solve problems concerning concentration units.
- f. Express problem answers using the correct units, rounded off values, and significant figures.
- g. Name the common chemical elements and simple inorganic compounds.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

- I. Problem-solving review.
 - A. What is the problem?
 - B. What will be the units for an answer?
 1. Unit approach to problem solving.
 - a. Advantages.
 - b. Disadvantages.
 2. Use of equivalents.
 - a. Value of concept of unity.

- a. Value of concept of unity.
 - b. Numerical expression of value.
 - C. What information is provided?
 - D. What information is needed?
- II. Problem setup.
 - A. Formula approach.
 - B. Unit approach.
 - C. Setup evaluation.
- III. Answer evaluation.
 - A. Are the units correct?
 - B. Is the answer reasonable?
 - C. Do the results check?
 - D. Significant figures.
- IV. Basic mathematics review.
 - A. Use of calculator.
 - B. Practice problems.
 - 1. Addition.
 - 2. Subtraction.
 - 3. Multiplication.
 - 4. Division.
 - 5. Formula manipulation.
 - C. Significant figures.
 - D. Scientific notation.
- V. Measurements.
 - A. Accuracy.
 - B. Precision.
 - C. Units.
 - 1. English system.
 - 2. Metric system.
- VI. Density and Specific Gravity.
 - A. Liquids.
 - B. Solids.
 - C. Gases.
- VII. Specific Heat Calculations.
- VIII. Use of Periodic Chart.
 - A. Atomic Number.
 - B. Atomic Weight.
 - C. Atomic Structure.
 - 1. Protons.
 - 2. Neutrons.
 - 3. Electrons.
 - a. Lewis dot structure.
 - b. Suborbital levels.
 - D. Other.
- VIII. Nomenclature.
 - A. Formula to chemical name.
 - B. Chemical name to formula.
 - C. Determination of ionic charge.

The following topics might be covered if time is available:
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- I. Quantitative Composition.
 - A. Physical states of matter.
 - B. Mole concept and molar mass.
 - C. Percent composition of compounds.
 - D. Formula calculations.
- II. Chemical equations.
 - A. General format and symbols.
 - B. Balancing by inspection.
 - C. Limiting reagent concept.
 - D. Yield calculations.
- III. Logarithms
- IV. The pH expression.
- V. Solution calculations.
 - A. Percent concept.
 - B. Molar calculations.
- VI. Equilibrium calculations.
- VII. Use of the gas laws.
 - A. Boyle's Law.
 - B. Charles' Law.
 - C. Gay-Lussac's Law.
 - D. Ideal gas equation.

REQUIRED READING:

Handout materials prepared by staff.

SUGGESTED READING:

Michels, Leo. A Basic Math Approach to Concepts of Chemistry. 6th Ed. Pacific Grove: Brooks/Cole Publishing Company, 1995.

REQUIRED WRITING:

Students may be asked to answer essay type problems demonstrating their understanding of basic chemistry in one or more paragraphs of written material; however, problem-solving exercises are more appropriate for this course.

OUTSIDE ASSIGNMENTS:

Students will be assigned homework worksheets which are then discussed in class.
Students will be required to read assigned materials.
Students will be required to study their lecture notes.

INSTRUCTIONAL METHODOLOGY:

Check all that apply:

- lecture
- laboratory
- lecture-laboratory combination
- directed study

If yes, check all that apply:

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

GRADING POLICY AND STANDARDS (include methods of determining whether the stated objectives have been met by students): Credit is received by class participation. Grading is Credit/No Credit only.

IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes No Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

CONTACT PERSON: Ronald Phillips

SIGNATURES:

SIGNATURES ON FILE
