

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

GENERAL CHEMISTRY I
CHEM 1110 (formerly CHM 1010)

Class Hours: 3.0

Credit Hours: 4.0

Laboratory Hours: 3.0

Revised: Spring 04

Catalog Course Description:

Modern atomic theory, chemical bonding, stoichiometry, kinetics. Course includes 3 hours of lecture and 3 hours of laboratory applications each week.

Entry Level Standards:

Two years of high school algebra or one year of high school algebra and one year of high school geometry are necessary for entrance to the course. Students requiring DSPM courses must complete these before taking CHEM 1110.

Prerequisites:

Two years of high school algebra and completion of DSP math requirements

Textbook(s) and Other Reference Materials Basic to the Course:

Whitten, Kenneth and Raymond Davis, Larry Peck, George Stanley. *General Chemistry*, 7th edition. Brooks/Cole, 2004.

CHEM 1110 Lab Notebook containing experiments (discussion, procedure, report sheets and homework sheets) and problem sets.

Programmable calculators may not be used on the tests in this course.

I. Week/Unit/Topic Basis:

| Week | Topic |
|-------------|---|
| 1 | Foundations of chemistry, ch. 1.1-1.3 |
| 2,3 | Chemical formulas and composition stoichiometry, ch. 2.1-2.12, Oxidation numbers and nomenclature, ch. 4.4-4.6 |
| 4 | Composition stoichiometry, chemical equations, and reaction stoichiometry, ch. ch. 3.1-3.5, 3.6 (part) |
| 5,6 | Chemical reactions, periodic table, ch. 4.1-4.3, 4.8-4.12, ch. 6.7,6.8 |
| 7 | Subatomic particles, electronic structure of atoms, ch. 5.1-5.19 |
| 8 | Periodic trends of the elements, ch. 6.1-6.6 |
| 9 | MIDTERM, Chemical bonding, ch. 7.1-7.6, 7.8-7.11 |
| 10 | Molecular structure, ch. 8.1-8.15 |

| | |
|-------|--|
| 11,12 | Gases and kinetic-molecular theory, ch. 12.1-12.15 |
| 13 | Equivalent weight (supplemental material), ch. 11.4 (part) |
| 14 | Liquids and solids, ch. 13.1 - 13.14 |
| 15 | Review |
| 16 | FINAL EXAM |

II. Course Objectives*:

- A. Understand the fundamental concepts of atomic structure, molecular structure and bonding. I.5.
- B. Predict properties of elements from the periodic table based on an acquired knowledge of periodic law. I.5.
- C. Apply the laws of chemistry and utilize the necessary mathematics to solve problems in chemical relationships. III.2., VI.1.
- D. Understand the fundamental concepts of kinetic molecular theory. I.5.

*Roman numerals after course objectives reference goals of the university parallel program.

III. Instructional Processes*:

Students will:

1. Use equipment (instruments, glassware and other tools) for obtaining measurements and observations. *Technological Literacy Outcome, Transitional Strategies*
2. Collect data, generate graphs and tables of the data, summarize and draw conclusions. *Numerical Literacy Outcome, Active Learning Strategies, Information Literacy Outcome*
3. Participate in laboratory exercises which develop teamwork, problem solving and data analysis. *Problem Solving and Decision Making Outcome; Active Learning Strategies, Personal Development Outcome*
4. Write summaries (in the form of conclusions) of the chemical concepts reinforced with the laboratory experiments. *Communication Outcome, Personal Development Outcome, Problem Solving and Decision Making Outcome, Numerical literacy Outcome*

*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Work problems with metric system units and convert units if necessary. C
2. Understand the concept of significant figures. C
3. Solve density, specific gravity and calorimetry problems. C

4. Understand the concepts of atoms, moles and molecules. A
5. Calculate atomic weights, formula weights and percent compositions. C
6. Derive chemical formulas from elemental composition. C
7. Write and balance chemical equations. A
8. Calculate percent purity and/or percent yield from a chemical reaction. C
9. Understand the concept of limiting reactant. C
10. List and describe the fundamental particles of an atom. A
11. Write the electronic structure of an atom. A, B
12. Write the quantum numbers for a specific electron. A
13. Predict properties of the elements using the periodic table. B
14. Draw Lewis structures for the elements and for compounds. A, B
15. Determine oxidation numbers. A, B
16. Name compounds and/or write their formulas. A, B
17. Label bond type(s) for an element or compound and describe molecular type. A
18. Determine if hybridization is occurring and if so describe. A
19. Classify chemical reactions. A
20. Understand the concept of electrolytes. A
21. Understand kinetic molecular theory and how it relates to gases, liquids, and solids. D
22. Understand and solve problems with gases. C, D
23. Calculate calorimetry problems involved in phase changes. C, D

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures: 75% of grade

Chapter exams and comprehensive midterm--55 %
Comprehensive final examination--20 %

There will be 5 chapter(s) exams approximately every two weeks (equal points) and ONE may be dropped. If absent, the missed exam is automatically dropped. The departmental midterm (week 9) and final (week 16) will be multiple choice. Midterm (50min.) will cover material from ch.1-part of ch.6. Final (110min.) will cover all material with emphasis on ch. 6 (part) - ch. 13 and equivalent weight.

B. Laboratory Expectations: 25% of grade

Pre-lab activities, lab reports, homework sheets, problem sets and lab final:

Attendance is required for scheduled lab meetings. Labs may NOT be made up! Experiment report sheets are to be completed in ink. No "white-out" allowed! Problem sets and the Lab Final Exam may be completed in pencil.

Safety eye wear must be worn during every lab involving an experiment. See lab schedule for order/dates of labs and problem sets.

C. Field Work:

N/A

D. Other Evaluation Methods:

Bonus points and/or extra credit given during the lecture portion of the course may not exceed 10% of the total grade earned in the course. This means that the total bonus points possible on tests or extra assignments should not exceed 20% of the total points earned in class (50% of 20% = 10%).

E. Grading Scale:

| | | |
|-----------|---|--|
| 90 - 100 | A | NO plus grades (B+ and C+) are given. Percentages may be rounded up if > 0.5 at the instructor's discretion. |
| 80 - 89.9 | B | |
| 70 - 79.9 | C | |
| 60 - 69.9 | D | |
| <60 | F | |

VI. Policies:

Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course.