

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

GENERAL CHEMISTRY II
CHEM 1120 (formerly CHM 1020)

Class Hours: 3.0

Credit Hours: 4.0

Laboratory Hours: 3.0

Revised: Spring 04

Catalog Course Description:

Chemical equilibrium, thermochemistry, electrochemistry, introduction to organic chemistry. 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.

Prerequisite:

CHEM 1110

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

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

CHEM 1120 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	Solutions (review terms, concentrations and dilutions), ch. 3.6, 3.7, 11.3, 11.4, 14.8
2	Solutions (dissolution process, colligative properties), ch. 14.1-14.15
3	Acids, bases and salts (review), ch. 4.2, 4.6, 4.11 ch.10.1-10.11
4	Chemical equilibrium, ch. 17.1-17.11
5	Ionic equilibria I: acids and bases (strong and weak electrolytes, pH, polyprotic acids, salts), ch. 18.1-18.10
6,7	Ionic equilibria II: acids and bases (buffers and titration curves). ch. 19.1- 19-8
8	MIDTERM, Ionic equilibria III: salts (solubility product principle, K _{sp}) ch.20.1-20.3
9	Chemical kinetics, ch. 16.1- 16.9
10	Nuclear chemistry, ch. 26.1- 26.16

- 11 Oxidation-reduction reactions (balancing equations, redox titrations), ch. 4.4, 4.7, ch. 11.5, 11.6
- 12 Electrochemistry, (electrolytic cells, Faraday's Law) ch. 21.1- 21.7
- 13 Electrochemistry (voltaic cells, standard electrode potentials, Nernst equation), ch. 21.8-21.19, 21.22, 21.23
- 14 Organic chemistry (a brief introduction)
- 15 REVIEW
- 16 FINAL EXAM

II. Course Objectives*:

- A. Acquire a skill in mathematical calculations related to solution chemistry. III.2, VI.1
- B. Acquire a knowledge of the nature and behavior of electrolytes. I.5, III.1
- C. Balance redox equations, understand the concepts of electrochemistry and acquire a skill in the related mathematical calculations. I.5, VI.1
- D. Understand and perform mathematical calculations of single and multiple ionic equilibria. III.2, VI.1
- E. Identify nuclear particles, balance nuclear equations and distinguish between nuclear fission and fusion. 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 in a laboratory setting. *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 solution problems that involve dilutions and expressing various concentrations. A
2. Understand the dissolution process and colligative properties. A
3. Solve colligative property problems. A
4. Understand and recognize the different acid-base theories. B
5. Distinguish between strong vs. weak acids and bases and understand their reactions. B
6. Understand the procedure and calculations involved in a titration. A, B, D
7. Understand the concepts involving the chemical equilibrium constant, K, A
8. Recognize electrolytes and understand their behavior. B
9. Determine pH and solve calculations involving the concentration of the hydrogen ion. A, B, D
10. Understand the concept of buffer solutions. A, B, D
11. Understand and perform calculations involving salt hydrolysis. A, B, D
12. Determine the solubility product constant, K_{sp} . A, B, D
13. Understand the concepts of chemical kinetics and determine the rate constant, k. A, D
14. Identify nuclear particles and balance nuclear reactions. E
15. Understand radioactive decay of a nuclide and determine its rate of decay and half-life. E
16. Distinguish between nuclear fusion and fission. E
17. Balance oxidation reduction reactions by the change in oxidation number method and the half reaction method. C
18. Solve redox problems. C
19. Diagram electrolytic and voltaic cells and understand the redox reactions involved. C
20. Determine standard electrode potentials and use the Nernst equation if standard conditions do not exist. C

*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 8) and standardized final (week 16) will be multiple choice. Midterm (50

min.) will cover material discussed the first 7 weeks. Final (110 min.) will be comprehensive and cover material from CHEM 1110 and CHEM 1120.

B. Laboratory Expectations: 25% of grade

Pre-lab activities, lab reports, homework sheets, problem sets and lab final -- 25%
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, homework sheets 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+)
80 - 89.9	B	are given. Percentages may be
70 - 79.9	C	rounded up if > 0.5 at the
60 - 69.9	D	instructor's discretion.
<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.