

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-25

I. CATALOG DESCRIPTION

Course Number: CHEM 1100
Course Title: General Chemistry II
Prerequisite(s): CHEM 1090 - General Chemistry I
Catalog Description: This is the second course of a comprehensive chemistry sequence. Topics include solutions, kinetics, equilibrium, acid-base reactions, solubility, thermodynamics, and electrochemistry.

Credit Hours: 4.0
Class Hours: 45.0
Lab Hours: 30.0
Total Contact Hours: 75.0

II. COURSE OBJECTIVES: *Course will:*

- A. Expand upon the correct structures and diagrams of atoms, ions, and molecules.
- B. Integrate calculations involving concentrations and colligative properties.
- C. Disseminate the effects of thermodynamic and kinetic factors on chemical reactions.
- D. Describe the relationships between ion concentration and the equilibrium constant.
- E. Introduce pH calculations involving strong acids, weak acids, strong bases, weak bases, salts, buffers, common-ion mixtures, and neutralization reactions.
- F. Delineate solubility concepts to qualitative and quantitative situations.
- G. Introduce the effects of enthalpy, entropy, and Gibb's free energy on the spontaneity of chemical reactions.
- H. Describe the principles of electrochemistry in multiple situations including the analysis of electrochemical cells.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
 - A. Calculate solution concentrations.
 - B. Apply principles of colligative properties.
 - C. Apply principles of chemical kinetics.
 - D. Perform calculations involving chemical equilibria.
 - E. Predict reaction outcomes based on chemical equilibria and LeChatlier's principle.
 - F. Demonstrate an understanding of the properties of acids and bases, including pH, buffers, acid and base equilibria in weak acids and bases and acid-base equilibrium constants.
 - G. Describe the relationships between enthalpy, entropy, and Gibb's free energy.
 - H. Demonstrate an understanding of oxidation-reduction reactions in terms of electron transfer.
 - I. Explain the electrical nature of reactions and electrochemical cells in terms of oxidation-reduction reactions.
 - J. Demonstrate the ability to perform lab experiments safely, to interpret the data collected, and to draw reasonable conclusions based on the data.
- B. General Education Learning Outcomes
 - 1. GELO #3: Critical Thinking & Problem Solving
Outcome: Collect, identify, interpret and analyze data.

Outcome: Synthesize information to arrive at reasoned solutions to problems.

Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.

2. GELO #5: Analytical, Quantitative, and Scientific Reasoning

Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.

Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Solutions
- B. Chemical kinetics
- C. Chemical equilibria
- D. Acids and bases
- E. Thermodynamics
- F. Electrochemistry

V. INSTRUCTIONAL MATERIALS

A. Required Text(s):

- 1. Paperback:
ISBN 978-1-59399-579-9
Chemistry 2e, Flowers, Paul, et al, OpenStax, 2019.

Hardback:
ISBN 978-1-94717-264-7
Chemistry 2e, Flowers, Paul, et al, OpenStax, 2019.

Free Online version:
<https://openstax.org/details/books/chemistry-2e>

Free ebook download:
<https://openstax.org/details/books/chemistry-2e>

The required AKTIV homework:
<https://aktiv.com/>

B. Other Resources:

- 1. TI-30XIIS Scientific Calculator (optional, recommended)

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

- 1. Lecture
- 2. Discussion
- 3. Demonstration
- 4. Group activity
- 5. Application
- 6. On-Line
- 7. Distance education
- 8. Laboratory activities

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Participation
2. Assignments
3. Exams
4. Projects
5. Papers
6. Lab work
7. Instructors will distribute and discuss evaluation and his/her grading policies with students at the beginning of each term.

B. SCC GRADING SCALE

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		