

**OHLONE COLLEGE**  
**Ohlone Community College District**  
**OFFICIAL COURSE OUTLINE**

**I. Description of Course:**

1. **Department/Course:** CHEM - 101B

2. **Title:** General Chemistry

3. **Cross Reference:**

4. **Units:** 5

**Lec Hrs:** 3

**Lab Hrs:** 6

5. **Repeatability:** No

6. **Grade Options:** Grade Only (GR)

7. **Degree/Applicability:**

Credit, Degree Applicable, Transferable -  
CSU & UC (T)

8. **General Education:** District General  
Education (Plan A)

I. Natural Science

9. **Field Trips:** Not Required

10. **Requisites:**

**Prerequisite**

CHEM 102 Preparation for General  
Chemistry and Student can also take the  
Chemistry Placement Exam to  
demonstrate satisfactory mastery of Basic  
Chemistry.

MATH 152 Algebra II and Student may  
demonstrate satisfactory mastery of  
Advanced Algebra by taking the Math  
Placement Test

12. **Catalog Description:**

Chemistry 101B continues the study of chemistry taught in CHEM-101A. Theory and mathematical applications are emphasized. This course is designed for science-oriented majors including biology, chemistry, engineering, and pre-professional health. Topics include organic chemistry, kinetics, equilibrium, acids and bases, solubility, thermodynamics, electrochemistry, nuclear chemistry, and coordination compounds.

13. **Class Schedule Description:**

For science oriented, health-professional, and pre-engineering students.

14. **Counselor Information:**

Math skills and good study habits are essential. This is a BIG course.

**II. Student Learning Outcomes**

The student will:

1. Practice and apply principles of chemistry

2. Describe the behavior of atoms and the changes they undergo.

3. Identify matter from a molecular point of view in order to understand natural phenomenon.

4. Demonstrate problem-solving techniques, both qualitative and quantitative.

5. Describe the historical developments that have led to the modern view of the nature of matter and energy.

6. Identify factual information which will serve as a data base as they interpret events occurring in nature.
7. Describe how chemistry, often called the "Central Science," interrelates with biology, geology, and a host of other scientific fields.
8. Identify problems that are waiting for solutions, and identify vocational fields that require scientific training.
9. Practice basic lab skills, emphasizing safety.
10. Properly dispose of chemical waste.
11. Identify means by which a chemist may protect the environment.

### III. Course Outline:

- A. Main-group elements and the Periodic Table
  1. Properties of elements and their compounds
  1. Trends, comparisons, and patterns of elements
  1. Types of bonding
  1. Intermolecular forces
- B. Organic compounds and the atomic properties of carbon
  1. Nomenclature
  2. Functional groups
  3. Properties
  4. Reactions
  5. Chirality
- C. Kinetics and mechanisms of reactions
  1. Factors which influence rate
  2. Rate laws
  3. Reaction mechanisms
- D. Equilibrium
  1. Equilibrium constants
  2. Practical applications
  3. Le Chatelier's Principle
  4. Qualitative problem solving
  5. Quantitative problem solving
- E. Acids and Bases
  1. Theories and principles
  2. Acid Equilibrium Constants
  3. pH and pOH
  4. Qualitative problem solving
  5. Quantitative problem solving
  6. Titrations
  7. Indicators
- F. Ionic equilibria in aqueous systems
  1. Buffer systems
  2. Practical applications
  3. Solubility Constants
- G. Thermodynamics
  1. Enthalpy
  2. Entropy
  3. Free Energy
  4. Arrhenius' Equation

5. Qualitative problem solving
6. Quantitative problem solving

#### H. Electrochemistry

1. Voltaic cells
2. Electromotive Force
3. Nernst equation
4. Electrolysis
5. Qualitative problem solving
6. Quantitative problem solving

#### I. Nuclear chemistry

1. History
2. Isotopes and half life
3. Reactions

#### J. The Transition elements

1. A closer look at periodic trends; accounting for exceptions
2. Coordination compounds
  - a. Nomenclature
  - b. Isomers
3. Crystal field theory

#### K. Applied chemistry

1. Biology and Biotechnology
2. Environmental
3. Industrial
4. Geochemistry

### IV. **Course Assignments:**

#### A. Reading Assignments

1. Text book chapters, internet searches

#### B. Projects, Activities, and other Assignments

1. Exam(s)
2. Quizzes-covering assigned problems and reading assignments
3. OWL online homework
4. Using "clickers" (instantaneous feedback devices) during lecture

#### C. Writing Assignments

1. Lab Report(s) - data collection, analysis of data, calculations, conclusions

### V. **Methods of Evaluation/Assessment:**

- A. Tests, quizzes, final exam which may include multiple choice, problem solving (qualitative and quantitative), writing equations, short-answer, or essay questions.
- B. Lab reports, which may include short answer, problem solving (qualitative and quantitative), writing balanced chemical equations, using these equations to answer questions, and scientific reports

### VI. **Methods of Instruction:**

- A. Lecture
- B. Laboratory
- C. Discussion
- D. Demonstration
- E. Audiovisual
- F. Computer Assisted Instruction

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G. Collaborative Learning

H. Other

1. "Clicker" technology which permits instantaneous electronic feedback from students during lecture

## VII. Textbooks:

### Required

1. Kotz, Treichel & Weaver *Chemistry and Chemical Reactivity* 8 Edition, McGraw-Hill, 2006 ISBN: 9780495271611
2. this has been customized into two volumes, so that students only buy the portion they need; i.e. students buy the first half for Chem 101A and the second half for Chem 101B.
3. Students also purchase the lab manual.

### Optional

## VIII. Supplies:

- A. Disposable lab gloves
- B. Goggles with indirect venting and side shielding
- C. Lab coat
- D. Lab notebook
- E. Scientific calculator

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