

CH 001B: GENERAL CHEMISTRY II

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Originator

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Co-Contributor(s)**Name(s)**

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Justification / Rationale

Update SLOs

Effective Term

Spring 2020

Credit Status

Credit - Degree Applicable

Subject

CH - Chemistry

Course Number

001B

Full Course Title

General Chemistry II

Short Title

GEN CHEMISTRY II

Discipline**Disciplines List**

Chemistry

Modality

Face-to-Face

Catalog Description

This is the second course of a two-semester sequence covering the basic principles and concepts of chemistry with emphasis on chemical calculations. Inorganic chemistry is stressed, and the material includes a discussion of thermodynamics, reaction kinetics, chemical equilibrium, acid-base equilibria in aqueous solutions, electrochemistry. There is a brief introduction to organic, biological and nuclear chemistry. The laboratory part of the course complements the lectures and also includes one experiment on qualitative analysis of cations and anions.

Schedule Description

This course is the second of a two-semester sequence covering the basic principles and concepts of chemistry with emphasis on chemical calculations. Prerequisite: CH 001A IGETC: 5A, 5C

Lecture Units

4

Lecture Semester Hours

72

Lab Units

1

Lab Semester Hours

54

In-class Hours

126

Out-of-class Hours

144

Total Course Units

5

Total Semester Hours

270

Prerequisite Course(s)

CH 001A

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Beran, J.A.

Title

Laboratory Manual for Principles of General Chemistry

Edition

10th

City

New York, NY

Publisher

John Wiley Sons Inc.

Year

2014

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

9781118621516

Resource Type

Book

Author

Jespersion, N.D., Brady, J.E. Hyslop, A.

Title

Chemistry: The Molecular Nature of Matter

Edition

7th

City

New York, NY

Publisher

John Wiley Sons Inc.

Year

2015

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

9781118516461

Resource Type

Web/Other

Description

Selected articles from: J. Chem. Education, New Scientist and Discover

Class Size Maximum

24

Entrance Skills

Describe the different forms of matter.

Prerequisite Course Objectives

CH 001A-Describe the kinetic molecular theory of matter, states of matter and use the gas laws in calculations.

Entrance Skills

Describe atomic structure to the level of atomic orbitals.

Prerequisite Course Objectives

CH 001A-Describe atomic structure to the level of atomic orbitals and explain the relationship to periodicity.
CH 001A-Describe the shapes of molecules in terms of valence bond theory, hybrid orbitals and molecular orbitals.

Entrance Skills

Explain the relationship between electronic structure and periodicity.

Prerequisite Course Objectives

CH 001A-Describe atomic structure to the level of atomic orbitals and explain the relationship to periodicity.

Entrance Skills

Distinguish between different types of chemical bonds and the shapes of molecules in terms of valence bond theory, hybrid orbitals and molecular orbitals.

Prerequisite Course Objectives

CH 001A-Describe atomic structure to the level of atomic orbitals and explain the relationship to periodicity.
CH 001A-Distinguish between different types of chemical bonds.
CH 001A-Describe the shapes of molecules in terms of valence bond theory, hybrid orbitals and molecular orbitals.

Entrance Skills

Solve problems in stoichiometry.

Prerequisite Course Objectives

 CH 001A-Solve problems in stoichiometry.

Entrance Skills

Recognize and describe the different varieties of chemical reactions, including balancing REDOX equations.

Prerequisite Course Objectives

 CH 001A-Recognize and describe the different varieties of chemical reactions, including balancing REDOX equations.

Entrance Skills

Describe the kinetic molecular theory of matter, states of matter and use the gas laws in calculations.

Prerequisite Course Objectives

 CH 001A-Describe the kinetic molecular theory of matter, states of matter and use the gas laws in calculations.

Course Content

1. Thermodynamics.
2. Reaction kinetics and mechanisms.
3. Chemical equilibria relating to mass action laws, acids and bases, pH and buffers, solubility.
4. Electrochemistry.
5. Chemistry of selected representative and transition elements.
6. Introductory organic and chemistry, emphasis on nomenclature and functional groups.
7. Introduction to biochemistry, emphasis on macromolecules.

Lab Content

1. Students will continue acquiring efficiency in performing REDOX, acid-base titrations using Vernier equipment.
2. Students will determine the rate law and activation energy
3. Students will perform an experiment on the thermodynamics of solubility and calculate enthalpy, entropy and Gibbs free energy and graph the data.
4. Students will do an experiment on electrochemistry using the Nernst equation
5. Students will perform qualitative analysis of the standard sub-groups of cations and selected anions.
6. Students will also become familiar with organic chemistry by synthesizing aspirin.

Course Objectives

	Objectives
Objective 1	Describe the laws of thermodynamics and compute energy changes in reactions.
Objective 2	Describe the kinetics of reactions, perform calculations using rate laws and describe basic reaction mechanisms.
Objective 3	Analyze the nature of chemical equilibria, the Law of Mass Action and perform calculations involving equilibria, weak acids and bases, pH, buffers and slightly soluble substances.
Objective 4	Predict the outcome of reactions based on the electrochemical activity series and perform related calculations.
Objective 5	Compare and contrast selected representative and transition elements.
Objective 6	Delineate simple organic and biochemical functional groups and their reactions.
Objective 7	Describe the nature of radiation and its measurement, balance nuclear equations and explain the process of fission and fusion and their relationship to binding energy.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Analyze data using kinetic, thermodynamic, and equilibrium calculations to draw plausible conclusions.
Outcome 2	Relate the macroscale observations of a reaction to microscale mechanistic concepts.
Outcome 3	Apply chemical terminology to provide explanations of observed chemical phenomena.

Outcome 4 Perform second semester laboratory experiments using modern chemical equipment safely and accurately.

Outcome 5 Design and carry out a process to solve a chemical problem experimentally.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Classroom discussion to improve critical thinking.
Technology-based instruction	Use CANVAS
Participation	Solving problems in groups during lab and lecture.
Lecture	1. Lecture presentations including visual aids. 2. Handouts summarizing lecture material.
Laboratory	Laboratory work to give "hands-on" knowledge.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework	The laboratory assignments will be graded for ability to follow directions and for clarity of presentation.	In and Out of Class
Mid-term and final evaluations	There will be a comprehensive final examination on the lecture material.	In Class Only
Tests/Quizzes/Examinations	Examinations including essay and multiple-choice questions and fill in the blanks.	In Class Only
Laboratory projects	Lab reports and lab practical. Each lab experiment is three hours long once a week.	In and Out of Class

Assignments

Other In-class Assignments

1. Complete all laboratory experiments in the manual.

Other Out-of-class Assignments

1. Read all relevant material.
2. Complete all assigned problems.
3. Complete all laboratory experiments in the manual.
4. Identify unknowns in the qualitative analysis laboratory section.

Grade Methods

Letter Grade Only

COD GE

C1 - Natural Sciences

CSU GE

B1 - Physical Science

B3 - Laboratory Activity

IGETC GE

5A - Physical Science

5C - Science Laboratory

MIS Course Data

CIP Code

40.0501 - Chemistry, General.

TOP Code

190500 - Chemistry, General

SAM Code

E - Non-Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transferable to both UC and CSU

C-ID

CHEM 120S

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

03/15/2019

Academic Senate Approval Date

03/14/2019

Board of Trustees Approval Date

04/10/2019

Course Control Number

CCC000329814

Programs referencing this courseEnvironmental Science AS-T (<http://catalog.collegeofthedesert.eduundefined?key=216/>)Chemistry UC Transfer Pathway AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=274/>)

Liberal Arts: Math and Science AA Degree (<http://catalog.collegeofthedesert.eduundefined?key=29/>)

Biology AS-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=40/>)

Chemistry AS-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=41/>)

Geology AS-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=42/>)

Nutrition and Dietetics AS-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=7/>)

Chemistry AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=75/>)