

Bergen Community College
Division of Science and Health
Department of Science and Technology

Course Syllabus
CHM-140 General Chemistry I

Semester and year:

Course Number:

Meeting Times and Locations:

Instructor:

Office Location:

Phone:

Office Hours:

Email Address:

COURSE DESCRIPTION:

CHM-140 General Chemistry I is a study of the fundamental laws and theories of chemistry. Topics covered include units of measurement, dimensional analysis, stoichiometry, aqueous reactions, thermochemistry, electronic structure of the atom, periodicity, chemical bonding, molecular geometry and properties of gases.

CREDITS/HOURS: 3 credits/ 3 hours

PREREQUISITES: MAT-032 or MAT-035 or equivalent by an appropriate placement as a result of the New Jersey Basic Skills Placement Test
AND
CHM-100, or a passing score on the CHM-100 challenge exam.

RECOMMENDED COREQUISITE: CHM-141 AND MAT-045 are **strongly** recommended.

GENERAL ED COURSE: Yes

STUDENT LEARNING OBJECTIVES: As a result of meeting the requirements in this course, students will be able to:

1. Use metric units.
2. Develop and use conversion factors to solve problems.
3. Write names and formulas for inorganic compounds.
4. Identify and name acids, bases, salts and oxides.
5. Solve stoichiometry problems.
6. Apply the empirical gas laws.
7. Explain and interpret the kinetic theory of gases.
8. Interpret the enthalpy changes of chemical processes.
9. Explain the wave nature of light and the modern view of the atom.
10. Use the principles of quantum mechanics to predict the electron configurations of atoms and ions.
11. Explain the nature of chemical bonds.
12. Predict the three-dimensional shapes of small molecules.
13. Define and explain technical terms used in chemistry.

ASSESSMENT MEASURES:

The student learning objectives will be assessed by:

1. Assigned homework problems from the text
2. Quizzes
3. Class participation
4. Unit Examinations (a minimum of 3)
5. Final Examination (comprehensive)
6. A writing component in the form of essays or short answer questions on examinations.

At the discretion of the instructor, assessment measures may be somewhat modified.

TEXTBOOK: General Chemistry, 8th Edition, Special Edition/Selected Chapters: Darrell D. Ebbing and Steven D. Gammon; Houghton Mifflin; Boston; 2004.

note: **The Student Solutions Manual is available as separate purchase.**

COURSE CONTENT:

- Chapter 1: Chemistry and Measurement. *Students are expected to review most of this material on their own.*
- Chapter 2: Atoms, Molecules and Ions.
- Chapter 3: Calculations with chemical formulas and equations.
- Chapter 4: Chemical Reactions (*Section 4.6 is optional*)
- Chapter 5: The Gaseous State. Real gases covered qualitatively only.
- Chapter 6: Thermochemistry. (*Section 6.9 optional.*)
- Chapter 7: Quantum Theory of the Atom. (*Uncertainty principle covered qualitatively only*)
- Chapter 8: Electron Configurations and Periodicity.
- Chapter 9: Ionic and Covalent Bonding. (*Section 9.9 is optional*)
- Chapter 10: Molecular Geometry and Chemical Bonding Theory. (*Sections 10.5 10.7 are optional.*)

SUPPLEMENTARY READINGS / MATERIALS:

1. Chemistry, The Central Science, 10th Edition, Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. Bursten; Prentice Hall, New Jersey; 2006.
2. Chemistry Matter and its Changes, 4th Edition, James E. Brady, Joel W. Russell, John R. Holum; John Wiley and Sons Inc., New Jersey; 2004.

3. General Chemistry, 8th Edition, Raymond Chang; McGraw Hill, New York; 2005.
4. Chemistry, 4rd Edition, John McMurry and Robert C. Fay; Prentice Hall, New Jersey; 2003
5. Chemistry and Chemical Reactivity, 6rd Edition, John C. Kotz, Paul M. Treichel; Gabriella C. Weaver; Thomson Learning Inc., California; 2006.
6. Chemistry: The Molecular Science, 2nd Edition, John W. Moore, Conrad L. Stanitski, Peter C. Jurs; Brooks/Cole, Thomson Learning Inc., California; 2005.

OTHER REQUIREMENTS:

A scientific calculator is required.

GENERAL GRADING POLICY:

Assigned homework problems from the text	not more than 10%
Quizzes	not more than 15%
Class participation	not more than 5%
Unit Examinations (a minimum of 3)	60 to 75%
Final Examination (comprehensive)	10 to 25%

1. Any examination not taken will receive a grade of zero. Make - up examinations will be administered in accordance with the instructor's policy.
2. Any student caught cheating (including using unauthorized formula sheets of any kind) will receive a grade of zero on that particular examination or paper. That zero cannot be replaced by any other examination grade or extra work.
Please read The Bergen Community College Statement on academic integrity as found in the college catalog.
3. Late work is not accepted.
4. At the discretion of the instructor, the grade on the final examination may be substituted for the lowest unit exam grade for the purpose of calculating the course grade provided that the final examination grade is higher than the lowest unit examination grade.
5. Instructors may make small modifications to the grading policy.

INSTRUCTOR'S GRADING POLICY:

Will be provided separately by the individual instructor.

ATTENDANCE/LATENESS POLICY:

All students are expected to attend punctually every scheduled meeting of each course in which they are registered. Attendance and lateness policies and sanctions are to be determined by the instructor for each section of each course. These will be established in writing on the individual course outline. Attendance will be kept by the instructor for administrative and counseling purposes.

OTHER POLICIES:**Electronic Devices:**

The use of portable electronic devices such as pagers and cell phones is not permitted while class is in session. Please silence these devices before entering class.

STUDENT AND FACULTY SUPPORT SERVICES:

Students experiencing difficulty with the arithmetic or problem solving aspects of this course should acquaint themselves with the services of the Tutoring Center and Smarthinking.

The BCC Library provides extensive support services for student research.

Faculty office hours may be a productive vehicle for assistance in understanding the course material.

A wide variety of services are available to students with documented disabilities through the Office of Specialized Services (OSS). It is highly recommended that students with disabilities contact OSS [Room S-131; (201) 612-5270] during the college application process.

FACULTY ABSENCE PROCEDURE:

A daily listing of cancelled classes will appear in a glass case near the main corridor on the first floor. Another such listing will appear in a glass case in Ender Hall. Students can consult these cases before going to class. If students find a class cancelled which has not been listed, they should report this to the Divisional Dean's Office, S-338, or the Evening Office L113.

All BCC students enrolled in credit courses are entitled to a WebAdvisor account. With WebAdvisor, you may register online, check your schedule, room assignments, GPA, and find out what courses you need to take. To find out more about WebAdvisor or to sign up online, visit <http://go.bergen.edu>! While there, please make sure you give us your preferred email address. You'll find directions how to do this at <http://go.bergen.edu/email>.

Course Outline and Calendar
CHM-140 General Chemistry I

<u>Week</u>	<u>Topic/Activity/Assignments</u>	<u>Student Learning Objectives</u>
1	Introduction to course Chapter 1: Law of Conservation of Mass Physical and Chemical Changes Units and Unit Analysis Assigned homework problems	1, 2, 13
2	Chapter 2: Atomic Theory Naming Compounds and Writing Formulas Assigned homework problems	3, 4, 13
3	Chapter 2: Writing and Balancing Equations Assigned homework problems	1, 2, 3, 5, 13
	Chapter 3: Mole Concept Mass Percentages Assigned homework problems	2, 5, 13
4	Chapter 3: Empirical and Molecular Formulas Stoichiometry Assigned homework problems	2, 5, 13
5	Test (Chapters 1 to 3) Chapter 4: Electrolytes and Precipitation Reactions Assigned homework problems	2, 3, 4, 5, 13
6	Chapter 4: Acid/Base and Redox Reactions Solution Chemistry and Quantitative Analysis Assigned homework problems	2, 3, 4, 5, 13
7	Chapter 5: Gas Pressure and Measurement Empirical Gas Laws and Ideal Gas Law Stoichiometry and Gas Mixtures Assigned homework problems	2, 3, 4, 5, 6, 13
8	Chapter 5: Kinetic Molecular Theory Assigned homework problems	7, 13
	Chapter 6: Thermochemistry Heats of Reactions and Measurement Assigned homework problems	1, 2, 3, 8, 13

<u>Week</u>	<u>Topic/Activity/Assignments</u>	<u>Student Learning Objectives</u>
9	Chapter 6: Hess's Law and Standard Enthalpies Assigned homework problems	8, 13
	Chapter 7: Wave Nature of Light Quantum Mechanics and Quantum Numbers Assigned homework problems	9, 10, 13
10	Test 2 (Chapters 4 to 6)	
	Chapter 8: Electron Configuration Assigned homework problems	9, 10, 13
11	Chapter 8: Orbital Diagrams Hund's Rule Periodicity and The Periodic Table Assigned homework problems	9, 10, 13
	Chapter 9: Ionic Bonds Assigned homework problems	3, 4, 11, 13
12	Chapter 9: Covalent Bonds Electronegativity Assigned homework problems	3, 4, 11, 13
	Chapter 9: Lewis Structures Resonance Structures Assigned homework problems	3, 4, 11, 12, 13
13	Chapter 10: VSEPR Theory Assigned homework problems	3, 4, 11, 12, 13
	Test 3 (Chapters 7 to 9)	
14	Chapter 10: Valence Bond Theory Dipole Moments Assigned homework problems	3, 4, 11, 12, 13
15	Review Final Exam	

The above calendar may be modified at the discretion of the instructor to accommodate test dates.

Bergen Community College
Core Competencies

CHM-140 General Chemistry I

<u>Competency</u>	<u>Student Learning Objectives</u>
1. Communication	7, 9, 11, 13
2. Quantitative Reasoning	1, 2, 5, 6, 8
3. Critical Thinking	5, 6, 7, 9, 10, 12, 13
4. Technological and Information Fluency	11, 12, 13
5. Applied Knowledge	1 - 13