Rowan College at Burlington County

Fall 2020

Division of Science, Technology, Engineering, and Mathematics

CHE 115-102, General Chemistry I, 3 Credits,
Prerequisites: High school chemistry or CHE 107/CHE 108 and algebraic skills equivalent to MTH 012

Day/Time/Location: *Mon/Wed, 11:00 to 12:20, VIRTUAL BLACKBOARD COLLABORATE*

Instructor: Terrence Sherlock, Assistant Professor Office location TEC 211D
Contact Information: tsherlock@rcbc.edu, ext. 2028, www.chemistry-solutions.com
Office Hours: TO BE DETERMINED

SECTION 1: Course Information

Course Description This course is a systematic study of fundamental principles and concepts including chemical measurement, atomic structure, periodicity, chemical bonding, thermo-chemical equations, stoichiometry of chemical reactions, the liquid, solid and gaseous states, and solution chemistry. Additional information can be found at:

http://www.rcbc.edu/files/PDFFiles/CrsOutlines/CHE%20PDF/CHE115.pdf

Recommended Text and other Materials

Chemistry; Burdge, Julia, 5th edition
(The e-book version will appear in your Blackboard course shell on the first day of class. This is a downloadable version that will last for five years.)

Calculator: A calculator is necessary for this course. A calculator capable of scientific notation (also called exponential notation) is suggested. (TI-30XA is one example of a suitable calculator for CHE115.)

Course Learning Outcomes Upon completion of the course, students will be able to:

- Perform calculations related to dimensional analysis, stoichiometry, thermodynamics, and ideal gas laws.
- Explain and restate basic theories of chemical bonding, quantum theory, periodicity, solution chemistry, and gas laws.
- Propose and interpret the properties of chemical compounds based on an understanding of their structure.

General Educational Outcomes
Written and Oral Communication (Communication): Students will communicate meaningfully with a chosen audience while demonstrating critical thought.
Scientific Knowledge and Reasoning (Science): Students will demonstrate critical thinking skills in the analysis of scientific data.

Core Course Content

- Dimensional Analysis
- Atomic Structure and Periodicity
- Chemical Bonding
- Stoichiometry
- Thermochemistry (Introduction to Thermodynamics)
- Chemical Reactions
- Solid, Liquid, and Gaseous States of Matter
- Aqueous Solutions

SECTION 2: Course Structure

Classroom and Course Policies
It is expected that you will attend all classes, take good notes, work hard and be accountable for your own success or failure. Get help in office hours and/or Tutoring when you need it.

Criteria for Grade Determination
The Grading Standard System *is explained in the current RCBC College Catalog, located at http://www.rcbc.edu/files/PDFFiles/publications/Catalog/RCBC1516Catalog-081015.pdf*

Evaluation and Assessment
The course grade is determined from the average score of 4 exams. All exams will be given in the classroom during class time.

The letter grade for this course is determined by the numerical course % using the following table:

Numerical Course %	*Course Letter Grade*
(89.5-100%)	*A*
(85.5-89.4%)	*B^+*
(79.5-85.4%)	*B*
(75.5-79.4%)	*C^+*
(69.5-75.4%)	*C*
(59.0-69.4%)	*D*
(<59.0%)	*F*

Note: There is no extra credit work available. Exams cannot be retaken.

Academic Integrity:
To help maintain the college's policy on academic integrity, any student found cheating on an exam or assignment will receive a grade of zero for that exam or assignment.
Course Schedule or Calendar
See Blackboard and www.chemistry-solutions.com for current schedule.

Objectives in each textbook chapter for CHE115

A student should be able to:

Chapter 1

1. Understand and employ the scientific method.
2. Understand and employ scientific notation.
3. Understand the metric system and perform unit conversions.
4. Understand different temperature scales and perform unit conversions.
5. Perform calculations with density, mass, and volume.
6. Understand precision, accuracy, significant figures, and rounding numbers. Perform calculations and obtain answers with the correct number of significant figures.
7. Understand dimensional analysis and perform unit conversions.

Chapter 2

1. Demonstrate an understanding of basic atomic structure, atomic number, and mass number.
2. Demonstrate and understanding of the organization of and information in the periodic table.
3. Predict combining ratios for compounds (subscripts in a formula).
4. Name the molecular and ionic compounds when given the formulas.
5. Write the formulas of molecular and ionic compounds when given the names.

Chapter 3

1. Calculate molecular weights, formula weights, and molar mass.
2. Understand and calculate percent composition of compounds
3. Interpret, complete, identify types of, and balance basic chemical equations.
4. Perform calculations with moles, grams, and Avogadro's number.
5. Determine empirical formulas and molecular formulas
6. Calculate the amount of reactant needed and the amount of product formed based on stoichiometry and limiting reactant.
7. Determine the limiting reactant.
8. Calculate the % theoretical yield.

Chapter 4

1. Understand and interpret the general properties of aqueous solutions
2. Complete and balance precipitation reactions, acid-base reactions, and redox reactions.
3. Understand and be able to use a solubility table and an activity series table.
4. Define oxidation and reduction. Identify which element is oxidized and which element is reduced.
5. Perform calculations involving molarity, acids, bases, and salts.
6. Perform calculations involving solution concentrations, dilutions, and titrations.

Chapter 5

1. Understand the definitions pertaining to thermochemistry.
2. Perform calculations involving enthalpy, heat, and specific heat.
3. Perform calculations using the Hess's Law.

Chapter 6

1. Understand and perform calculations involving the frequency, wavelength, and energy.
2. Understand the concept of atomic line spectra and atomic orbitals.
3. Understand quantum numbers, Hund's rule, the Pauli Exclusion Principle, the Aufbau Principle, and electron configurations.
4. Relate an element's position in the periodic table to its electron configuration.

Chapter 7

1. Describe and predict periodic trends in atomic radius, ionization energy, reactivity, metallic character.
2. Describe and understand the modern periodic table, the group trends, metal characteristics, and nonmetal characteristics.

Chapter 8

1. Draw Lewis symbols for atoms and Lewis structures for ions, and molecules.
2. Demonstrate an understanding of the octet rule, ionic bonding, covalent bonding, polar bonds, multiple bonds, formal charge, and resonance.
3. Understand electronegativity and its trend.

Chapter 9

1. Demonstrate an understanding of the VSEPR theory.
2. Predict the electron-domain and molecular geometries of molecules and ions.
3. Predict the polarity of polyatomic molecules.
4. Demonstrate an understanding of the valence bond theory and hybridized orbitals.
5. Understand Pi and Sigma bonds.
6. Understand electron delocalization and resonance.

Chapter 10

1. Understand the general properties of a gas.
2. Be able to calculate pressure, volume, temperature, or moles using the ideal gas equation or combined gas law equation.
3. Be able to calculate partial pressures, total pressures, and mole fractions.

Chapter 11

1. Understand the differences between a gas, liquid, and solid.
2. Understand the concept of and types of intermolecular forces.
3. Understand effects of intermolecular forces on physical properties, such as boiling point, viscosity, surface tension, and vapor pressure.
4. Define and understand viscosity, surface tension, vapor pressure, and capillary action.
5. Be able to calculate the energy required for a given phase change.
6. Understand and interpret heating curves and phase diagrams.

Chapter 12 (As time permits)

1. Understand the terminology and chemistry involved with forming polymers.

Chapter 13

1. Understand the solution process and the role of intermolecular forces.
2. Understand the various concentration expressions.
3. Understand the factors affecting solubility.
4. Understand the colligative properties.

SECTION 3: College Resources

College Policies In order for students to know their rights and responsibilities, all students are expected to review and adhere to all regulations and policies as listed in the College Catalog and Handbook. These documents can be accessed at http://www.rcbc.edu/publications . Important policies and regulations include, but are not limited, to the following:

- College Attendance Policy
- Grading Standards
  - Withdraw (W) and Incomplete Grades (I & X)
  - Withdrawal deadline for this semester: October 30, 2019
- Student Code of Conduct
  - Academic Dishonesty/Plagiarism and Civility
- Use of Communication and Information Technology

Office of Student Support and Disability Services

RCBC welcomes students with disabilities into the college's educational programs. Access to accommodations and support services for students with learning and other disabilities is facilitated by staff in the Office of Student Support (OSS). To receive accommodations, a student must contact the OSS, self-identify as having a disability, provide appropriate documentation, and participate in an intake appointment. If the documentation supports the request for reasonable accommodations, the OSS will provide the student with an Accommodation Plan to give to instructors. For additional information, please contact the Office of Student Support at 609-894-9311, ext. 1208, disabilityservices@rcbc.edu, or http://www.rcbc.edu/studentsupport .

Educational Technology Statement

Rowan College at Burlington County (RCBC) advocates the use of technology to enhance instruction. Students should assume that classroom and online technology will be used throughout their coursework at RCBC, as it will most certainly be used in their future education and careers. The College provides on-campus facilities for the convenience of the RCBC community. Various college departments, including the Office of Information Technology and the Office of Distance Education, provide technology training and assistance to faculty and students.

Student Success Services RCBC offers a variety of free services for its students including those listed below. Descriptions of these services, as well as many others, can be found in the College Catalog and Handbook and on the RCBC website at http://www.rcbc.edu/students .

- Academic Advisement (http://www.rcbc.edu/advising)
- Career Services (http://www.rcbc.edu/careers)
- Educational Opportunity Fund (EOF) (http://www.rcbc.edu/eof)
- Financial Aid (http://www.rcbc.edu/financialaid)
- International Students Office (http://www.rcbc.edu/international)
- Library/Integrated Learning Resource Center (ILRC) (http://www.rcbc.edu/library)
- Office of Veteran Services (http://www.rcbc.edu/vets)
- Student Support Counseling (http://www.rcbc.edu/counseling)
- Tutoring Center (http://www.rcbc.edu/tutoring)
- Test Center (http://www.rcbc.edu/testcenter)
- Transfer Services (http://www.rcbc.edu/transfer)

This syllabus is subject to change at the instructor's discretion. All students will be notified if a change is made.