

# Rowan College at Burlington County

## Spring 2019

Division of Science, Technology, Engineering, and Mathematics

CHE 115-100, 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: *Section 100 Mon/Wed 9:30 to 10:50 SB 218*  
*Section 102 Mon/Wed 12:30 to 1:50 TEC 206*

Instructor: Terrence Sherlock

Contact Information: [tsherlock@rcbc.edu](mailto:tsherlock@rcbc.edu), phone 2028, [www.chemistry-solutions.com](http://www.chemistry-solutions.com)

Office Hours: Mon/Wed 11:00 to 12:00, Tue/Thur 1:00 to 1:30 and 4:00 to 4:30

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### **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>

### **Required Text and other Materials**

Chemistry The Central Science; Brown, Lemay, Bursten, Murphy, 14<sup>th</sup> edition  
(*This book is on reserve at the RCBC library; the edition is prior to the 14<sup>th</sup> ed.*)

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**

### **Course and Classroom Policies**

*It is expected that you will attend all classes, take good notes, work hard and be accountable for your own success or failure..*

### **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>*

### **Assessment Methods**

*There are 4 units and an exam to be taken at the end of each unit. From time to time, other quizzes or projects may be assigned during the semester..*

## Evaluation and Assessment

The course grade is determined from the average scores 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:

<u>Numerical Course %</u>	<u>Course Letter Grade</u>
(89.5-100%)	A
(84.5-89.4%)	B <sup>+</sup>
(79.5-84.4%)	B
(74.5-79.4%)	C <sup>+</sup>
(69.5-74.4%)	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

This information is found on Blackboard and also on [www.chemistry-solutions.com](http://www.chemistry-solutions.com)

## **Objectives in each textbook chapter for CHE115**

A student should be able to:

### **Chapter 1**

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

### **Chapter 2**

1. Predict combining ratios for compounds (subscripts in a formula).
2. Demonstrate an understanding of basic atomic structure.
3. Demonstrate an understanding of the organization of and information in the periodic table.
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. Complete, identify types of, and balance basic chemical equations.
2. Calculate molecular weights, formula weights, and molar mass.
3. Perform calculations with moles, grams, and Avogadro's number.
4. Calculate the amount of reactant needed and the amount of product formed based on stoichiometry and limiting reactant.
5. Determine the limiting reactant.
6. Calculate the % theoretical yield.

### **Chapter 4**

1. Perform calculations involving molarity, acids, bases, and salts.
2. Perform calculations involving solution concentrations, and perform titration calculations.
3. Define oxidation and reduction. Identify which element is oxidized and which element is reduced.
4. Complete and balance precipitation reactions, acid-base reactions, and redox reactions.
5. Understand and be able to use a solubility table and an activity series table.

### **Chapter 5**

1. Perform calculations involving enthalpy, heat, and specific heat.
2. Understand the definitions pertaining to thermochemistry.

### Chapter 6

1. Understand and perform calculations involving the frequency, wavelength, speed of light, and energy.
2. Relate an element's position in the periodic table to its electron configuration.
3. Understand quantum numbers, Hund's rule, the Pauli Exclusion Principle, and how they relate to electron configurations.

### Chapter 7

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

### Chapter 8

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

### 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 hybridized orbitals.
5. Understand Pi and Sigma bonds.
6. Understand electron delocalization and resonance.

### Chapter 10

1. Understand the general characteristics of a gas.
2. Be able to calculate pressure, volume, temperature, or moles using the ideal gas equation (or some variation of the equation).
3. Be able to calculate partial pressures, total pressures, and mole fractions.

### Chapter 11

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

### 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 factors affecting solubility.
3. Understand the various concentration expressions.
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 date for this semester: October 29, 2018
- 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](mailto:disabilityservices@rcbc.edu), or <http://www.rcbc.edu/studentssupport> .

### **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.**