Chemistry 111, Principles of Chemistry – Fall 2021

Section 07

Instructor: Dr. Donald Barry

Class Time: TTh: 12:35-1:30 PM
Place: SSMB Room 138 (School of Science and Math Building)
Office Hours: On Zoom by appointment (send e-mail to schedule)

Phone: Cell: 978-807-1755
e-mail: barryd@cofc.edu

Introduction: Chemistry 111 is the first semester of a two-semester course that is intended to provide you with a strong foundation for upper-level courses in the Chemistry Department. As a part of this learning community you will better understand the connections between the study of chemistry and other scientific areas. The course requires that the students and the professor invest time and energy but this investment should be rewarding for whatever career you select.

Overall Learning Objectives:

- Know the definition of chemistry and the scientific method
- Use common mathematical techniques to solve chemistry problems
- Understand the role of the atom in chemistry
- Distinguish, classify, and explain the properties of compounds
- Recognize and explain the fundamental nature of chemical reactivity
- Differentiate and describe the principles of the gas phase of matter

Co-requisite: Chemistry 111 Lab, which is a separate one-hour course is a co-requisite and Math 111 course work or proven competency is a co-requisite.

Texts:

Chemistry 112, the next course in the Chemistry sequence, will cover the remaining chapters in the book. Do not sell your textbook at the end of the semester if you are continuing on to Chem 112.

2) ALEKS is a module which must be purchased separately from the textbook, either at the bookstore or on line (see instructions on the web at Aleks.com). For more information on ALEKS see below.  
**The Class Code for Aleks is** [EXHP6-KVTJJ](https://Aleks.com) 

**Calculator:** You will need a non-programmable calculator for exams.

**Course Expectations:**

A. Attendance

Class attendance is to your benefit and mandatory. Missing more than 5 classes (with or without excuse) is grounds for a student being dropped from the class. Performance in the course is directly proportional to attendance. Students are responsible for all information presented in class whether they are present or not. Students should obtain notes from a classmate, read the associated material in the text and on OAKS, and then ask questions during class or during the zoom office hours.

Only students officially registered (graded or auditing) for this course may attend class. During the week following the drop/add deadline, the professor will verify student enrollments in this course. Any student appearing on the class roll but determined not to have attended the class even once will be removed.

For the benefit of both your fellow students and your professor, mask wearing during class is requested although not yet required.
B. Responsibilities
You are accountable for all material covered or assigned in class. You are expected to spend whatever time it takes to learn the material and to do both ALEKS and the homework. I am here to explain the material as best as I can, but it is a joint effort and we all must invest the effort to make this class a success. I expect all students to participate in class.

C. Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when suspected, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student’s actions are related more to misunderstanding and confusion will be handled by the instructor. The instructor designs an intervention or assigns a grade reduction to help prevent the student from repeating the error. The response is recorded on a form and signed both by the instructor and the student. It is forwarded to the Office of the Dean of Students and placed in the student’s file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This status indicator will appear on the student’s transcript for two years after which the student may petition for the XX to be expunged. The F is permanent.

Students can find the complete Honor Code and all related processes in the Student Handbook at: http://deanofstudents.cofc.edu/honor-system/studenthandbook/.”

D. Accommodations for Students with Disabilities

The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying
me as soon as possible and for contacting me one week before accommodation is needed.

E. Course Materials:

All lecture materials and homework will be available to students on OAKS. Although all lectures will be based on the power points, additional insights will be given during class and hence you will still need to take careful lecture notes. The best use of our time is when you are following the lecture and we are working problems together. OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.

F. Inclement Weather, Pandemic or Substantial Interruption of Instruction

If our classes are suspended, I will announce to students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

G. Email

Email is considered an official method for communication at the College of Charleston. College of Charleston email accounts are automatically assigned to all students upon acceptance at the College. If a student wishes to have email redirected from their official College issued account to another email address (e.g. @aol.com, @hotmail.com, @yahoo.com, or any other server other than the official @g.cofc.edu), they may do so, but at their own risk.

Students are expected to check their College of Charleston official email on a frequent and consistent basis in order to remain informed of College related communications. Checking email on a daily basis is recommended.

H. Homework
A major key to success (both mine and yours) in this class is doing chemistry problems again and again. Homework is worth 10% of your final grade and the assignments will be posted on OAKS on the Thursday, a week prior to the Friday, due date (noted in this syllabus). Grading of the homework is based on legibility and correctness. If the homework is not legible, it will get a zero so I suggest typing your answers or printing very neatly. You should then scan it and save it to the OAKS drop box. The drop box in OAKS does not handle iphone images well so you will need to make other arrangements. Finally, if for some unforeseen reason, you cannot get to the drop box then you can send your homework as an attachment to an e-mail but please let me know that you are doing so.

I. ALEKS

ALEKS = Assessment and LEarning in Knowledge Spaces is a Web-based, artificially intelligent assessment and learning system.

ALEKS uses adaptive questioning to quickly and accurately determine exactly what a student knows and doesn't know in a course. ALEKS then instructs the student on the topics she is most ready to learn. As a student works through the course, ALEKS periodically reassesses the student to ensure that topics learned are also retained and these are called Knowledge Checks. During a Knowledge Check, the student will lose access to the on-line text until the student finishes the Knowledge Check. There are 3 Knowledge Checks in our course, the first one is a preassessment of your skills entering the class and the last two to analyze how well you are retaining the material.

You should do the preassessment skills check, as soon as possible but no later than the start of class. DO NOT DELAY THIS CRITICAL ANALYSIS.

ALEKS due dates are noted on-line at the ALEKS site and you must finish each module (11 in total) before 10:30 PM of the Due Date.

The class code is EXHP6-KVTJJ

Aleks is worth 10% of your grade and is graded on how much of each module you complete. The final date for completing ALEKS is 12/8/20.
Once the due date is past you cannot go back and complete a module. So do ALEKS early.

For any problems with ALEKS let me know promptly and we will solve it together.

J. Hourly Exams

The following are tentative dates for the exams. These dates are subject to change.
Tuesday, September 21
Tuesday, October 20
Thursday, November 19

Final Exam: The Final Exam will be given at 12/13 at 1:00-3:00 PM in SSMB 138. It is scheduled to last 1.5 hours.

Makeups: There are NO makeup tests. If you miss an exam and have an excellent reason then your grade will be based on your remaining tests and other class work. You may not miss more than one exam. In cases of major illnesses or other reasonable issues we will work together to develop a solution which is fair to you, your fellow students and me.

K. Supplemental Instruction and Tutoring:

The learning community will have an SI for the course that is responsible for providing additional instruction of the chemistry content. Our SI is to be determined. The SI will be arranging a variety of times and methods when they will be available to work through problems with you. Your attendance is not required, but data has shown that students who use SI do better in the course. Also, tutoring at the Center for Student Learning in chemistry is available to students at no cost. The times and methods for use of this resource are being determined but further information is available online at (http://csl.cofc.edu/labs/).

L. Grading:
Your final grade will be calculated by the following formula:

3 Exams: top 2 (20% each and 15% for lowest)  55%
Final Exam  25%
**Homework** 10%  
**ALEKS** 10%  
**Total** 100%

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M. The Course:

**Course Methodology:**

A. All lectures will be held in person. All material will be on OAKs or in the textbook  
B. Class participation is critical so don’t miss class.  
C. All **Office Hours** are on Zoom. I have decided to be flexible on office hours so I only ask that you reserve a time by e-mail and gather as many of your colleagues to share in the session as you can.  
D. If you have any other suggestions or comments please feel free to let me know.

**Basic Structure of the Course:**

**Module 1- The atom – Chapters 1-4**  
**Module 2-Molecules and Bonding -Chapters 5-7**  
**Module 3-Chemical Reactions and Energetics – Chapters 8-10**  
**Module 4 -Gases – Chapter 11**

These topics are covered in Chapters 1-11 in your book.
PROPOSED CLASS SCHEDULE (SUBJECT TO CHANGE)

8/24/21: First Day of Class
- Discuss Syllabus
- Chapter 1
  - Scientific Method
  - Matter
  - Scientific Measurement

8/26/21
Homework Assignment 1 on OAKs -Due on 9/3 by noon
- Chapter 2
  - The Atom
  - Subatomic Particles and Atomic Structure
  - Atomic number, Mass number and Isotopes
  - Nuclear Stability
  - Atomic Mass

8/31/21
- Chapter 2 Cont'd
  - The Periodic Table
  - The Mole
  - Molar Mass

9/2/21
Homework Assignment 2 on OAKs -Due on 9/10 by noon
- Chapter 3
  - Forms of energy
  - Nature of Light
  - Elementary Quantum Theory

9/7/21
- Chapter 3 Cont'd
  - Bohr's Model of the Atom
  - Wave-Particle Duality
  - Quantum Mechanics
  - Quantum Numbers

9/9/21
Homework Assignment 3 on OAKs -Due on 9/17 by noon
- Chapter 3 Cont'd
  - Atomic Orbitals
  - Electron configurations

9/14/21
- Chapter 4
  - Development of the Periodic Table
  - Periodic Trends started
9/16/21
Homework Assignment 4 on OAKs -Due on 9/24 by noon
- Chapter 4 Cont’d
  - Periodic Trends
  - Ions

9/21/21 Test #1 on Chapters 1-4

9/23/21
- Chapter 5
  - Ionic Compounds
  - Naming Ions and Ionic compounds
  - Covalent Bonding
  - Molecular Formulas
  - Naming Molecular compounds
  - Molecular and Formula Masses

9/28/21
- Chapter 5 Cont’d
  - Percent Composition
  - Molar Mass
  - Determination of Empirical and Molecular Formula from percent composition

9/30/21
Homework Assignment 5 on OAKs -Due on 10/8 by noon
- Chapter 6
  - Lewis Structures
  - Multiple Bonds
  - Electronegativity

10/5/21
- Chapter 6 Cont'd
  - Polarity and Dipole moments
  - Drawing Lewis Structures
  - Formal Charge

10/7/21
Homework Assignment 6 on OAKs -Due on 10/15 by noon
- Chapter 6 Cont’d
  - Exceptions to the Octet rule
  - Resonance
- Chapter 7
  - VESPR Model
  - Molecular geometry

10/12/21
- Chapter 7 Cont'd
  - Valence Bond theory
  - Intermolecular forces
10/14/21
Homework Assignment 7 on OAKs -Due on 10/27 by noon
- Chapter 7 Cont’d
  - Hybridization
  - Molecular Orbital Theory
  - Comparison of Bonding Theories

10/19/21 Fall Break

10/21/21 Test #2 on Chapters 5-7

10/26/21
- Chapter 8
  - Chemical Equations
  - Combustion Analysis
  - Calculations with balanced Chemical Equations
  - Limiting Reactants

10/28/21
- Chapter 8 Cont’d
  - Limiting Reactants
  - Periodic Trends in Reactivity
  - Continue with Calculations with balanced Chemical Equations

10/29/21
- Last Day to withdraw from class

11/2/21
Homework Assignment 8 on OAKs -Due on 11/12 by noon
- Chapter 9
  - Electrolytes and Non-electrolytes
    - Strong and Weak Electrolytes
  - Solubility guidelines
  - Ionic reactions in aqueous solution

11/4/21
- Chapter 9 Cont’d
  - Acid-Base reactions
  - Strong acid vs. weak acid
  - Redox reactions
  - Balancing Redox reactions

11/9/21
- Chapter 9 Cont’d
  - Concentrations of solutions
  - Measuring pH
- Analysis of Aqueous reactions
- Acid-Base Titrations
- Analysis

11/11/21
Homework Assignment 9 on OAKs - Due on 11/24 by noon
- Chapter 10
  - Introduction to Thermodynamics
  - First Law of Thermodynamics
  - Work and Heat
  - Enthalpy

11/16/21
- Chapter 10 Cont'd
  - Thermochemical Equations
  - Calorimetry
    - Constant Pressure
    - Constant Volume
  - Heat Capacity

11/18/21 Test #3 - Chapters 8-10

11/23/21
Homework Assignment 10 on OAKs - Due on 12/3 by noon
- Chapter 10 Cont’d
  - Hess's Law
  - Standard Enthalpies of Formation
  - Bond Enthalpy
  - Lattice Energy

11/30/21
- Chapter 11
  - Kinetic Molecular Model of Gases
  - Gas Pressure
  - Boyles Law
  - Charles's Law
  - Ideal Gas Law
  - Applications of Ideal Gas Law

12/2/21
- Chapter 11 Cont’d
  - Real Gases
    - Van Der Waals Equation
  - Gas Mixtures-Dalton's Law
  - Gaseous Reactions
    - Partial Pressures
    - Mole Fraction
- Semester Review