GULF COAST STATE COLLEGE
DIVISION OF NATURAL SCIENCES

CHM 1045—General Chemistry, 3 credit hours

Section: 14782

Instructor: Dr. Alexander M. Haruk, Ph.D Chemistry **Email:** aharuk@gulfcoast.edu

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Office Hours: The Professor is available for any extra help/questions outside of class for 10 student office hours each week.

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Add/drop deadline: as per the GCSC Academic Calendar

Withdrawal deadline to receive a "W": as per the GCSC Academic Calendar

Prerequisite: MAC 1105, 1114, or 2311 with a minimum of C and CHM 1040 with a minimum of C.

Corequisite: CHM 1045L and MAC 1140 are corequisites with this course.

Course Materials: *Chemistry: A Molecular Approach*, 6th Edition, Tro; Pearson Mastering Chemistry access, non-programmable scientific calculator

Textbook: *Chemistry: A Molecular Approach* by Tro, 6th Edition, 2022, Publisher: Pearson

Textbook Options: The textbook is available in the bookstore with access to Mastering Chemistry included. The other option is to purchase the textbook from elsewhere. It is required to have a copy of the textbook. Three options below include both.

Mastering Chemistry 18-week access including eText ISBN 9780137831999

Mastering Chemistry 24-month access including eText ISBN 9780137831968

Looseleaf with Mastering Chemistry 24-month access included ISBN 9780137832057

Course Description: Topics covered are chemical calculations, inorganic nomenclature, chemical reactions, thermochemistry, gases, atomic structure, configurations, periodicity, oxidation-reduction, and chemical bonding, including MO and VSEPR theory.

Course Goals: Students will be able to calculate the amount of product formed or reactant required. Students will be able to think critically allowing them to predict theoretical yield and use theoretical and actual yield to calculate all quantities in simple and complex reactions.

CHM 1045 is the first semester of the two-semester sequence in general chemistry; CHM 1046 is offered as the second semester of the sequence. Upon successful completion of the two-semester sequence, a student has sufficient chemistry background to enter CHM 2210.

Introduction: This course is a 3-credit course, which means that in addition to the scheduled meeting times, students are expected to do **at least 6 hours** of course-related work outside of class **each week** during the semester. This includes time spent completing assigned readings, studying for tests and examinations, preparing written assignments, and other course-related tasks.

Lectures may consist of presentations, worked example problems, group activities, and individual assessments. They will occur in the designated classroom during the scheduled class time and will include periodic assessments that contribute to the final grade. Office hours will be in the office. Exams will be taken in-person on campus.

Attendance and Participation: According to the GCSC Student Handbook "Regular class attendance and participation are significant factors that help to promote success in college. Students are expected to attend all class meetings of all courses for which they are registered. You are expected to know the instructor's specific attendance policy, as stated in the syllabus for each course. In the event of absence, you should contact your instructor as soon as possible to indicate the reason and to inquire whether make-up work is possible. (Make-up work is offered solely at the discretion of your professor.) If your absences in a class become excessive, as stated in the course syllabus, your professor may contact you, indicating that further absence may result in your withdrawal from the course." **After the 3rd unexcused absence, you *MAY* be administratively withdrawn from the course.**

Canvas: Daily monitoring of the Canvas site (accessed through https://mygcsc.gulfcoast.edu/sso), as well as your GCSC email account, is essential for obtaining course-related information. Lectures, course supplements, and important announcements for this course will be posted to Canvas. Failure to check this resource is ***NOT*** a valid excuse for not receiving information communicated via this pathway.

Email/Voicemail: Emails will be replied to within 24 business hours during the regular workweek. The instructor will ***NOT*** email you everything you missed in class if you did not attend that day. Check Canvas and the course schedule for what you missed. Any high priority/urgent message sent will be returned as soon as possible during the regular workweek. Voicemail messages may be responded to via email.

Evaluation: Students will be evaluated by exams, quizzes, and homework. **The instructor reserves the right to amend these grading criteria for individual students to accommodate extraordinary health, personal, or family circumstances that are documented authoritatively in writing.**

Homework comes from the textbook and Mastering Chemistry and is worth 9% of the overall grade. Textbook homework will be hand written and turned in on the day they are due. Your homework should be **in order** and **clearly labeled**. **You will not get credit if you do not show your work. You will not get credit if your professor can not read your writing.**

Quizzes and pre-lecture chapter notes will be done periodically in the course and are 9% of the course. For in-person quizzes, **all work must be shown** to receive credit. Chapter notes are notes taken prior to lecture on the assigned sections from the textbook. Be sure to include any definitions, equations, example problems, and important concepts. Chapter notes are due at the start of class on the day they are due.

There will be five (5) in-person exams in the semester, the best four (4) of which will count 60% toward your final grade. Exams will consist of questions designed to evaluate student understanding of topics covered in lecture, quizzes, and homework. Students will be provided with a periodic table and a list of potentially useful information. The only other resource that will be permitted is a ***non-programmable scientific calculator.*** Individual students must supply their own calculator as these will NOT be provided for exams. For any short answer questions, **all work must be shown** to receive any credit for a question.

There will be a mandatory in-person final exam that will count 22% toward the final grade. The cumulative final exam will consist of questions from topics discussed throughout the semester. The final exam will be given during final exam week.

Letter grades will be assigned by the scale shown at the top of the next page. With this procedure, some students will be a few points shy of the next higher letter grade. This is ***not*** grounds for appeal to be given a higher grade. There will be **no curve**. Instructors reserve the right to adjust this scale, schedule, and the syllabus in general to account for unplanned events.

Homework	9%
Quizzes and Chapter Notes	9%
Best 4 Exams	60%
Cumulative Final Exam	22%
Total	100%

Letter Grade	Overall Percent
A	≥90
B	89-80
C	79-70
D	69-60
F	<60

Student Absences for Participation in Official University Events: Students at Gulf Coast have the opportunity to participate in many extracurricular activities that either contribute to the quality of their college experience or promote their post-graduation goals. At times, students' participation requires them to be absent from regularly scheduled class. Students are responsible for all work missed. According to the Student Handbook, **"It is the student's responsibility to notify his/her instructor or supervisor in advance and identify what tasks or assignments must be made-up before missing class or work hours."** If notice is not provided in a timely manner, accommodations will not be provided.

Students with Religious Obligations: We will make every effort to accommodate students with religious obligations for any part of this course. However, students must notify the instructor at the beginning of the semester of the requirements.

Accessibility Statement: Gulf Coast State College supports an inclusive learning environment for all students. If there are aspects of the instruction or design of this course that hinder your full participation, reasonable accommodations can be arranged. Prior to receiving accommodations, you must register with Student Accessibility Resources. Appropriate academic accommodations will be determined based on the documented needs of the student. For information regarding the registration process email sar@gulfcoast.edu or call (850) 747-3243.

Academic Integrity Policy: There is a ZERO TOLORENCE policy for cheating/plagiarizing in this course. The fairness of depends upon all students adhering rigorously to the fundamentals of academic integrity. **All students are disadvantaged by academic dishonesty whether they are the honest ones or the dishonest.** Honest students may find that their hard work is not properly recognized. Dishonest students may lose the essential connection between the amount they learn and the grade they receive, ultimately resulting in lack of preparation or qualification for their chosen life career.

Cheating or copying on homework problems, quizzes, or exams can result in a zero on the given assignment and even a failing grade in the course. Honest participation in academic endeavors fosters an environment in which optimal learning can take place and is consistent with the college's mission. Academic misconduct, including cheating or plagiarism, is destructive to the spirit of an educational environment and therefore will not be tolerated.

Students must review the Academic Integrity policy found in the student handbook, https://www.gulfcoast.edu/current-students/student-handbooks/2022-2023-student-handbook.pdf.

Sanctions for incidences of academic misconduct, depending on the severity of the incidence and/or its repetition, may range from receiving an F grade (or zero) for the test, assignment, or activity, to failure of the course, to suspension or dismissal from the program or the college.

Assessments: All quizzes and examinations will be assessments of individual student knowledge. The provision, use, or attempted use of any unauthorized aids will constitute academic dishonesty. Examples include but are not limited to: unauthorized collaboration of any sort during an examination; unauthorized use of notes, books, tapes, computers or other aids during an examination; allowing another person to take an examination in one's place; looking at someone else's examination during the examination period; allowing another person to use one's own examination during the examination period; passing examination information to students who have not yet taken the examination. The **minimum** penalty for academic dishonesty during a quiz or examination will be a zero for that assessment and a report to the Dean of Student Life.

Mastering Chemistry: Online assignments (homework sets and individual quizzes) are individual evaluations. Having any part of these evaluations performed by any other person other than the student is a violation of academic honesty.

HB233 statement: In accordance with federal and state privacy laws, students may record class lectures for their own personal educational use, in connection with a complaint to the college, or as evidence in internal or external legal proceedings. Students may not publish or upload the recordings or any components thereof without the knowledge and written permission of the faculty member. Failure to obtain permission to publish could lead to the students' having to pay damages, attorney fees, and court costs. For more information about what can be recorded, please see the guidelines in the current Student Handbook on the Gulf Coast State College website.

Other Useful Information

The PaperCut print management client is installed in all computer labs. The PaperCut user web console is accessed through the MyGCSC portal. The logon is the first part of your student email address, everything before the @mygulfcoast.edu. Students will be required to add money to their PaperCut accounts before they are able to print. Money can be added to student print accounts by cash, credit, or debit card. Cash is accepted at PaperCut kiosks located in the Library. Credit and debit card payments, minimum $5.00, can be made through the "add credit" tab on the PaperCut user web console. Instructions for the use of PaperCut are located at https://www.gulfcoast.edu/administration-departments/information-technology-services/printing/

Learning Objectives

- Chapter 1: Matter, Measurement, and Problem Solving
  - Apply the scientific approach (1.2)
  - Classify matter according to its composition (1.3)
  - Classify the properties and changes in matter as chemical or physical (1.4)
  - Compare the Fahrenheit, Celsius, and Kelvin temperature scales (1.6)
  - Express measurements using appropriate prefix multipliers (1.6)
  - Apply the density relationship to problems involving mass and volume (1.6)
  - Determine the number of significant figures in a measurement or reported number (1.7)
  - Determine the number of significant figures in the result of a given calculation (1.7)
  - Convert between units using dimensional analysis (1.8)
  - Solve problems involving equations (1.8)
- Chapter 2: Atoms and Elements
  - Apply the mass laws that are the basis of modern atomic theory (2.3)
  - Describe the experiments that led to the discovery of the electron and its charge (2.4)
  - Explain the structure of an atom (2.5)
  - Describe the properties of subatomic particles and interpret isotope symbols (2.6)
  - Relate the periodic law to the organization of the periodic table (2.7)
  - Predict the charge of ions (2.7)
  - Determine the atomic mass of atoms (2.8)
  - Apply the mole concept (2.9)
- Chapter 3: Molecules and Compounds
  - Analyze substances by bond type (covalent or ionic), compound type (molecular or ionic), and formula (chemical, molecular, and structural) (3.2, 3.3, 3.4)
  - Write formulas and names for ionic compounds (3.5)
  - Write formulas and names for hydrated ionic compounds (3.5)
  - Write formulas and names for molecular compounds (3.6)
  - Write formulas and names for acids and oxyacids (3.6)
  - Analyze the composition of compounds in terms of formula mass, mass percent, and moles (3.8 , 3.9)
  - Write chemical formulas from experimental data (3.10)
  - Write formulas and names for organic compounds (3.11)

- Chapter 4: Chemical Reactions and Quantities
    - Analyze substances by bond type (covalent or ionic), compound type (molecular or ionic), and formula (chemical, molecular, and structural) (3.2, 3.3, 3.4)
    - Write formulas and names for ionic compounds (3.5)
    - Write formulas and names for hydrated ionic compounds (3.5)
    - Write formulas and names for molecular compounds (3.6)
    - Write formulas and names for acids and oxyacids (3.6)
    - Analyze the composition of compounds in terms of formula mass, mass percent, and moles (3.8 , 3.9)
    - Write chemical formulas from experimental data (3.10)
    - Write formulas and names for organic compounds (3.11)
- Chapter 5: Introduction to Solutions and Aqueous
    - Analyze substances by bond type (covalent or ionic), compound type (molecular or ionic), and formula (chemical, molecular, and structural) (3.2, 3.3, 3.4)
    - Write formulas and names for ionic compounds (3.5)
    - Write formulas and names for hydrated ionic compounds (3.5)
    - Write formulas and names for molecular compounds (3.6)
    - Write formulas and names for acids and oxyacids (3.6)
    - Analyze the composition of compounds in terms of formula mass, mass percent, and moles (3.8 , 3.9)
    - Write chemical formulas from experimental data (3.10)
    - Write formulas and names for organic compounds (3.11)
- Chapter 6: Gases
    - Convert between units of pressure (6.2)
    - Calculate properties of gases using the simple gas laws (6.3)
    - Calculate properties of gases using the ideal gas law (6.4)
    - Analyze gas mixtures using Dalton's law of partial pressures (6.5)
    - Perform stoichiometric calculations involving gas reactions (6.6)
    - Calculate the root mean square velocity of a gas (6.8)
    - Calculate the effusion rate of a gas or the ratio of effusion rates of two different gases (6.9)
    - Calculate gas properties of real gases (6.10)
- Chapter 7: Thermochemistry
    - Analyze types of energy and convert between energy units (7.2)
    - Analyze changes in internal energy in terms of heat and work (7.3)
    - Determine heat from temperature changes (7.4)
    - Calculate quantities in thermal energy transfer (7.4)
    - Analyze processes involving pressure–volume work (7.4)
    - Analyze energy changes for combustion reactions inside a bomb calorimeter (7.5)
    - Predict endothermic and exothermic processes (7.6)
    - Perform stoichiometric calculations involving the enthalpy of reaction (7.6)
    - Analyze enthalpy changes for reactions in a coffee-cup calorimeter (7.7)
    - Analyze how changes in chemical reactions affect the enthalpy of reaction (7.8)
    - Determine the standard enthalpy change for a reaction using standard enthalpies of formation (7.9)
    - Analyze the effects of energy use on the environment (7.10)
- Chapter 8: The Quantum-Mechanical Model of the Atom
    - Analyze the wave properties and wave behaviors associated with light (8.2)
    - Analyze the particle properties and particle behaviors associated with light (8.2)
    - Analyze the wave properties of matter (8.4)
    - Describe orbitals using quantum numbers (8.5)
    - Calculate the energy change of an electron transition according to the Bohr model (8.5)

- Chapter 9: Periodic Properties of the Elements
    - Analyze the wave properties and wave behaviors associated with light (8.2)
    - Analyze the particle properties and particle behaviors associated with light (8.2)
    - Analyze the wave properties of matter (8.4)
    - Describe orbitals using quantum numbers (8.5)
    - Calculate the energy change of an electron transition according to the Bohr model (8.5)
- Chapter 10: Chemical Bonding I: The Lewis Model
    - Analyze the wave properties and wave behaviors associated with light (8.2)
    - Analyze the particle properties and particle behaviors associated with light (8.2)
    - Analyze the wave properties of matter (8.4)
    - Describe orbitals using quantum numbers (8.5)
    - Calculate the energy change of an electron transition according to the Bohr model (8.5)
- Chapter 11: Chemical Bonding II: Molecular Shapes, Valence Bond Theory, and Molecular Orbital Theory
    - Predict the basic shapes of molecules according to VSEPR theory (11.2)
    - Predict how lone pairs and electron groups affect molecular geometry (11.3, 11.4)
    - Predict the shape of larger molecules (11.4)
    - Predict the polarity of a molecular compound (11.5)
    - Determine the hybridization and bonding scheme of a molecule using valence bond theory (11.6, 11.7)
    - Predict properties of diatomic molecules using molecular orbital theory (11.8)
- Chapter 20: Electrochemistry
    - Balance acidic solution redox equations using the half-reaction method (20.2)
    - Balance basic solution redox equations using the half-reaction method (20.2)