Syllabus

Course Number: CHM 1025 sec 002  
Prerequisite(s): Grade C or above from MAT 0018, 0028 & 1033  
Course Title: Fundamentals of Chemistry  
Course Credit: 4  
Course Hours: 3.75 hours per week  
College: Science and Technology  
Department: Chemistry  
Course website: TBA  
Supplies: Non-programmable scientific calculator  
Faculty Name:  
Dr. Jesse Edwards  
Term and Year: Fall 2022  
Place and Time: TBA  
Office Location: TBA  
Telephone: 850-599-3638  
Email: jesse.edwards@famu.edu

### Philosophical Statement for Student Success

*Your Work Ethic Determines What You Learn, What You Learn Determines Your Grade*

1. **Course Description**  
   Fundamentals of Chemistry, CHM-1025 is a course designed to help students understand the basic concepts of chemistry and master the skills necessary to succeed in the main stream General Chemistry sequence, CHM 1045-1046

2. **Course Co-requisites**: High School Algebra II, MAC 1105 or the equivalent.

3. **General Objectives and Outcomes**  
   In accordance with the [Academic Learning Compact](https://www.famu.edu/administration/strategic-planning-analysis-and-institutional-effectiveness/university-assessment/pdf/2019_2020current-alcs/ChemistryALCs.pdf)  
   
   specific outcomes of the Department of Chemistry for CHM1025, students can be summarized under the following rubrics:
• **Demonstrate** critical thinking skills as measured by the ability to solve chemical problems, and read, evaluate, and interpret numerical, chemical and general scientific information.

• **Demonstrate** proficiency in written and oral communications.

• **Possess** a thorough knowledge of basic chemistry

• **Possess** the ability to make effective use of information resources in chemistry applications.

4. **Global Learning Outcomes**

   A. **Critical thinking** - Students will develop the ability to evaluate the validity of their own and other’s ideas through questioning and analyzing, and the skill to synthesize the results into the creative process.
      
      i. **Evaluate** contextual, numerical and graphical data for validity.

      ii. **Define, analyze, and devise** solutions for new and different word problems.

   B. **Scientific and Mathematical Literacy** - Students will apply the understanding of natural or behavioral scientific principles and methods as well as mathematical concepts and methods to solve abstract and practical problems.
      
      i. **Read, write, listen to and speak** the language of the sciences.

      ii. **Apply** principles of scientific inquiry to real world situations.

   C. **Information Management** - Students will use effective strategies to collect, verify, document, and manage information from a variety of sources.
      
      i. **Understand** how scientific information is organized.

      ii. **Use information-seeking strategies** necessary to access information efficiently and effectively.

      iii. **Use appropriate technology** to enhance scientific thinking and understanding.

5. **Online Materials**

   Constant use of the course website will have a major impact on your success in this course. Most of the relevant course materials (i.e., syllabus course outline, problem sets, quizzes, test/quiz grades, assignments, etc.) will be presented to you online via the website, **and not in class**.

   **Pearson’s My Lab Mastering Chemistry**

   Students must enroll in Pearson My lab and Mastering Chemistry. All course material will be posted on famu.blackboard.com or My lab and Mastering Chemistry (Quizzes and homework).

6. **Course Contents:**

   In CHM 1025, students should demonstrate understanding and knowledge in the following areas of Chemistry:

   - Chapter 1  The Chemical World
   - Chapter 2  Measurement and Problem Solving
   - Chapter 3  Matter and Energy
   - Chapter 4  Atoms and Elements
   - Chapter 5  Molecules and Compounds
   - Chapter 6  Chemical Compositions
   - Chapter 7  Chemical Reactions
   - Chapter 8  Quantities in Chemical Reactions
   - Chapter 9  Electrons in Atoms and the Periodic Table
Instructional Strategies: **Combined (Hybrid) pedagogic approaches** will be practiced
   a. *Traditional Lecturing.*
   b. *Active Learning*
   c. *Supplemental Instruction*

7. Learning Objectives by Chapter: At the conclusion of each section, you should know:

   **Part-1 Chapter 1- Chapter 5**

   Chapter 1 the Chemical World

   1.3 *Describe* the steps involved in the scientific method.
   1.4 *Analyzing* and *interpreting* data

   Chapter 2 Measurement and Problem Solving

   2.2. *Write* decimal numbers in scientific notation.
   2.3. *Explain* the significance of uncertainty in measurement in chemistry and how significant figure is use to indicate a measurement’s certainty.
   2.4. *Apply* the rules for significant figures, in calculations involving addition, subtraction, multiplication, and division.
   2.5. *Name* the units for mass, length, and volume in metric system and convert from one unit to another.
   2.6-9. *Use* dimensional analysis to solve problems involving unit conversions.
   2.10. *Solve* problems involving density.

   Chapter 3 Matter and Energy

   3.2-3. *Define* and classify matter according to its state.
   3.4. *Classifying* matter according to its composition.
   3.5-6. *Differences* in matter: Physical and chemical properties and chemical and physical changes.
   3.8. *Energy* and units of energy
   3.10. *Convert* measurements among the Fahrenheit, Celsius, and Kelvin temperature.

   Chapter 4 Atoms and Elements

   4.2. *Describe* Dalton’s model of the atoms and compare it to the earlier concepts of matter.
   4.3. The nuclear atom: how nuclear model of the atom differs from Dalton and Thomson’s models.
   4.4. *Describe* the three basic subatomic particles.
Define the terms atomic number
4.6. Patterns of Periodic table
4.7. Ion, losing and gaining electrons
4.8. Explain the relationship between the atomic mass of an element and masses of isotopes.
4.9. Atomic mass, Calculation of the average mass of an element

Chapter 5 Molecules and Compounds
5.2. Discuss the law of constant composition
5.3. How to represent a compound
5.4. Define an element and a compound
5.5. Write the chemical formula for an ionic compound.
5.6-8. Name binary ionic and nonionic compounds. Recognize names, formulas, and charges of Polyatomic ions, name compounds containing polyatomic ions, and write formulas from names of compounds containing polyatomic ions.
5.9-10. Naming Acids and Nomenclature summary
5.11. Calculation of Formula Mass


PART-2 Chapter 6 – Chapter 8
Chapter 6 Chemical Composition
6.2-3. Apply the concepts of the mole, molar mass, and Avogadro’s number to solve chemistry problems.
6.4. Counting Molecules by the gram, Calculate the molar mass of a compound.
6.5. Chemical Formulas as conversion Factors
6.6-7. Calculate the percent composition of a compound from its chemical formula and from experimental data.
6.8-9. Determine the empirical formula for a compound from its percent composition.
       Compare an empirical formula to a molecular formula and calculate a molecular formula from the empirical formula of the compound and its molar mass.

Chapter 7 Chemical Reactions
7.2. Describe the evidence of a chemical reaction.
7.3-4. Write and balance chemical equation.
7.5. Introduce aqueous solutions
7.6-9. Give examples of a combination reaction, decomposition reaction, single displacement reaction, gas evolution, and double-displacement reaction.

Chapter 8 Quantities in Chemical Reactions
8.1-2 Define stoichiometry and describe the strategy required to solve problems based on chemical equations.
8.3. Mole to Mole conversions. Solve problems in which the reactants and products are both in moles.
8.4. Solve problems in which mass is given and the answer is to be determined in moles or the moles are given and the mass to be determined. Solve problems in which mass is given and the answer is to be determined as mass.
8.5-6. Solve problems involving limiting reactants and yield.
8.7. Enthalpy of a reaction
PART-3 Chapter 9- Chapter 12

Chapter 9  Electrons in Atoms and the Periodic Table

9.2-3. **List** the three basic characteristics of electromagnetic radiation and describe the electromagnetic spectrum.

9.4. **Explain** the relationship between the line spectrum and the quantized energy levels of an electron in an atom (The Bohr Model). **Describe** the principal energy levels, sublevels, and orbitals of an atom.

9.5-6. **Describe** The Quantum-Mechanical Model. Use the guidelines to **write** electron configurations.

9.7-8. **Describe** how the electron configurations of the atoms relate to their position on the periodic table and **write** electron configurations for elements based on their position on the periodic table.

9.9. **Describe** the periodic trends.

Chapter 10 Chemical Bonding

10.2. **Draw** the Lewis Structure for a given atom.

10.3. **Discuss** the Lewis structure of an ionic compound.

10.4-5. **Draw** the electron structure of a covalent bond and compound and also for polyatomic ions.

10.6. **Discuss** the Resonance of the Lewis structure of the same molecules.

10.7. **Determine** the shape of a compound by using VSEPR method.

10.8. **Introduce** electronegativity and polarity.

Chapter 11 Gases

11.2. **Briefly explain** about Kinetic Molecular Theory

11.3. **Explain** atmospheric pressure and how it is measure. Be able to convert among the various units of pressure.

11.4. **Use** Boyle’s law to **calculate** changes in pressure or volume of a sample of gas at a constant temperature.

11.5. **Use** Charles’ law to **calculate** changes in temperature or volume of a sample of gas at constant pressure.

11.6. **Use** the combined gas law to **calculate** changes in pressure temperature, or volume of a sample of gas.

11.7. **Use** Avogadro’s law in calculation

11.8. **Use** the ideal gas law to solve problems involving pressure, volume, temperature and number of moles.

11.9. **Use** Dalton’s Law of pressures to calculate the total pressure from a mixture of gases or the pressure of a single gas in a mixture of gases.

11.10. **Solve** stoichiometric problems involving gases.

Chapter 12  Liquids, Solids and Intermolecular Forces

12.2. **Explain** why liquids tend to form drops and explain the properties of liquids and solids.

12.4. **Explain** about evaporation and condensation. Define boiling point and explain heating curve. Calculate the amount of energy involved in a change of state.

12.5. **Define** melting point and explain cooling curve. Calculate the amount of energy involved in a change of state.

12.6. **Describe** the three types of intermolecular forces and explain their significance in liquids.
PART 4  CHAPTER 13 – CHAPTER 14

Chapter 13  Solutions

13.2. **Define** homogeneous mixtures.
13.3. **Describe** how solute-solvent interaction affects the solubility.
13.5-7. **Solve** problems involving mass percent, volume percent, molarity and dilution.
13.9. **Use** the concept of colligative properties to calculate molality, freezing point, boiling point, freezing point depression, and boiling point elevation of various solution.
13.10 **Discuss** osmosis and osmotic pressure and their importance in living systems.

Chapter 14  Acids and Bases

14.2-3. **Discuss** the properties of acids and bases
14.4. **Compare** the molecular definitions of acids and bases, including Arrhenius and Bronsted-Lowry, acids and bases.
14.5. **Describe** the general reactions of acids and bases.
14.6. **Describe** a neutralization reaction and do calculations involving titrations
14.7. Strong and weak acids and bases. **Describe** properties, ionization, dissociation, and strength of electrolytes and compare them to nonelectrolytes.
14.8. Dissociation of water
14.9. **Calculate** the pH of a solution from the hydrogen ion concentration. Calculate the concentrations of $H^+$, $OH^-$, $P_{H}$ and $P_{OH}$ in a solution using the ion product constant for water.

### III. Tentative Schedule

<table>
<thead>
<tr>
<th>Course Overview</th>
<th>PART-I</th>
<th>Chapter 1 - 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Mastering Chemistry</td>
<td>2.4 Significant Figures in Calculation</td>
<td>2.10 Density</td>
</tr>
<tr>
<td>1.3 Describe the scientific method.</td>
<td>2.5 The Metric System</td>
<td>3.2-3Classify matter</td>
</tr>
<tr>
<td>1.4 Analyzing and Interpreting Data</td>
<td>2.6-9. Dimensional Analysis</td>
<td>3.4. Classify matter based on composition</td>
</tr>
<tr>
<td>2.1 Scientific Notation</td>
<td></td>
<td>3.5-6 Physical chemical changes</td>
</tr>
<tr>
<td>2.2 Measurement and Uncertainty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.8 Energy and calculations</td>
<td>4.4 subatomic particles</td>
<td>4.9 average atomic mass</td>
</tr>
<tr>
<td>3.10 Convert temperatures</td>
<td>4.5 Atomic Numbers</td>
<td>5.2 Law constant composition</td>
</tr>
<tr>
<td>4.2Dalton; s model</td>
<td>4.6 Pattern of periodic table</td>
<td>5.3 How to represent a compound</td>
</tr>
<tr>
<td>4.3 The nuclear atom</td>
<td>4.7 Ions</td>
<td></td>
</tr>
<tr>
<td>4.8 Atomic mass and masses of isotopes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4 Element and compound</td>
<td>5.4 Element and compound</td>
<td>5.9-10 Naming acids</td>
</tr>
<tr>
<td>5.5 chemical formula for ionic compound</td>
<td>5.5 chemical formula for ionic compound</td>
<td>5.11 Formula mass</td>
</tr>
<tr>
<td>5.6-7-8 Naming binary compound</td>
<td>5.6-7-8 Naming binary compound</td>
<td>Review</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# PART –2  Chapter 6 - 8

| 9/16 | 6.2-3 The Mole, Molar Mass of Compounds  
| | 6.4 Mole to gram conversion  
| | 6.5 chemical formula as conversion factors  
| 6.6-7 Percent Composition of Compounds  
| 6.8-9 Empirical formula  
| | Review Quiz 1  
| 7.2 Evidence of a chemical reaction  
| 7.3 write chemical reactions  
| 7.5 Aqueous solutions  
| 7.6-9 Types of chemical reactions  
| 7.4 Balance chemical reactions  
| 7.6 Balance chemical reactions cont. CH 07  
| 8.3 Mole-Mole Calculations  
| 8.5 Mass-Mass Calculations  
| 8.4 Mole-Mass Calculations  
| 8.6 Limiting Reactant and Yield Calculations  
| 8.7 Enthalpy of a reaction  
| 8.1-2 Introduction to Stoichiometry  
| October 5 REVIEW  
| Continued CH 08 and quiz review  
| 10/14 9/16 |  
| 10/14 | 9.2-3 Electromagnetic Radiation  
| | 9.4 The Bohr Atom  
| | 9.5 Quantum Mechanical model  
| | 9.6 Electron configuration  

# PART-3  Chapter 9- Chapter 12

| 9.7-9.8 electron configuration of atoms and their position of the periodic table  
| 9.9 Periodic Trends in Atomic Properties  
| 10.2 Lewis Structures of Atoms  
| 10.3 L. S. of Ionic compounds  
| 10.4-10.5 L. S. of Covalent compounds  
| 10.6 Resonance of Lewis structure  
| 9.7-9.8 electron configuration of atoms and their position of the periodic table  
| 9.9 Periodic Trends in Atomic Properties  
| 10.2 Lewis Structures of Atoms  
| 10.3 L. S. of Ionic compounds  
| 10.4-10.5 L. S. of Covalent compounds  
| 10.6 Resonance of Lewis structure  

\"
| 10.7 Lewis Structure of Compounds and Molecular Shape | 11.2-3 Properties of Gases and pressure measurement | 11.6 Combined Gas Law |
| 10.8 Electronegativity and polarity | 11.4 Boyle’s Law | 11.7 Avogadro’s Law |
| | 11.5 Charles’ Law | 11.8 Ideal Gas Law |
| | | 11.9 Dalton’s Law of Partial Pressure |
| | 12.4 condensation, evaporation | 12.6 Intermolecular Forces |
| | Boiling and Melting Point | |
| **REVIEW** | **11/11** | **13.2 Homogeneous mixtures** |
| | **EXAM #3** | **13.3 Solubility, Rates of dissolving solids** |
| | | **13.5-7 Concentration of Solutions** |
| | | **Colligative Properties** |

**PART 4**

**Chapter 13 – Chapter 14**

<table>
<thead>
<tr>
<th>Cont. Colligative properties</th>
<th>Holiday -- Veteran</th>
<th>14.2-3 Properties of Acids and Bases, Reactions of Acids and Bases, 14.4 molecular definition of acids and bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.10 Osmosis and Osmotic pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.6 Dissocation of weak acids, Electrolytes and Nonelectrolytes</td>
<td>14.8 Introduction to pH and pOH</td>
<td>REVIEW</td>
</tr>
<tr>
<td></td>
<td>14.9 Dissociation of water/Review</td>
<td></td>
</tr>
<tr>
<td><strong>12/2</strong></td>
<td><strong>EXAM #4</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Please note that the exam dates given in the above table are tentative, and are subject to change and you will be notified promptly when such changes are made, and what the changes are.*
Examinations: 4 periodic examinations are given in approximately three or four-week intervals to assess the student’s understanding and application of concepts covered in class since the beginning of the semester. Tentative Examination Schedule: TBA

MAKE-UP EXAMS:
MAKE UP EXAM WILL ONLY BE GIVING FOR SPECIAL CIRCUMSTANCES WITH THE PERMISSION FROM THE DEAN WITHIN A WEEK OF THE PARTICULAR EXAM. A SIGN DEAN EXCUSE FORM IS REQUIRED PRIOR TO THE MAKEUP EXAM. YOU MUST BE AWARE THAT NO MAKEUP EXAM FOR EXAM #4 WILL BE GIVING UNDER ANY CIRCUMSTANCES.

MAKE-UP QUIZZES: NO MAKE-UP QUIZZES WILL BE GIVEN IN THIS COURSE.

HOME WORKS: HW 1 – HW14 will be posted in Pearson’s My Lab Mastering chemistry. No make-up home works will be given. MAKE SURE TO FINISH HOMEWORKS BY DUE DATES AND HOME WORKS WILL NOT BE RE-OPENED UNDER ANY CIRCUMSTANCES.

NOTE: A SCIENTIFIC CALCULATOR IS NEEDED FOR THIS CLASS.

Grading
The final grade for this class will be computed as shown below:

<table>
<thead>
<tr>
<th>Event</th>
<th>% Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Hour Exams</td>
<td>4 x 20 = 80</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10</td>
</tr>
<tr>
<td>Homework</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
</tr>
<tr>
<td>Total:</td>
<td>100</td>
</tr>
</tbody>
</table>

Grade Calculation:
Example:
Test 1= 80, Test 2= 50, Test 3= 85, Final exam= 60
Test Average = (90 +50+85+60)/4
Test Avg. = 71.25
Point contribution from tests for the final grade = \( \frac{\text{Test avg} \times 80}{100} \)
\[ = \frac{71.25 \times 80}{100} \]
\[ = 57 \] Line 1

Quiz 1= 60, Quiz 2= 75, Quiz 3= 55, Quiz 4= 65
Quiz Average = \( \frac{60 + 75 + 55 + 65}{4} \)
Quiz Avg. = 63.75
Point contribution from Quizzes for the final grade = \( \frac{\text{Quiz Avg} \times 10}{100} \)
\[ = \frac{63.75 \times 10}{100} \]
\[ = 6.38 \] Line 2

HW 1=90, HW 2= 90, HW 3=70, HW 4=90, HW 5= 85, HW 6=70, HW 7=90, HW 8= 80, HW 9=70, HW10=100
HW Average = \( \frac{90 + 90 + 70 + 70 + 85 + 70 + 90 + 80 + 70 + 100}{10} \) (total number of HWs it may be more than 10)
HW Avg. = 83.5
Point contribution from Homework for the final grade = \( \frac{\text{HW Avg} \times 10}{100} \)
\[ = \frac{83.5 \times 10}{100} \]
\[ = 8.35 \] Line 3

To calculate final grade point, add lines 1, 2, and 3
Your final grade point = 57 + 6.38 + 8.35
\[ = 71.73 \text{ points } \sim 72 \text{ points, Letter grade C} \]

Final Grades (%)

A: 90-100, B: 80-89, C:65-79, D:60-64, F: below 60

The instructor reserves the right to adjust the grading scale so as to conform to the performance of the class. Please note that this does not in any way imply “CURVING.” Students will be informed when and if any adjustments are made to the grading scale.

NOTE: LAST DAY TO WITHDRAW FROM COURSE IS NOV 4TH

Course Policies

Attendance Policy: attendance is taken during each class meeting. It is your responsibility to write your signature next to your name on the daily roll sheet. If you fail to do this, you are absent—no exceptions.

Students ARE ALLOWED one unexcused absence per credit hour of the course. A student exceeding the number of unexcused absences (4) for a four-credit hour course will be dropped from the course assigned a grade of "F".

Academic Honor Policy Statement

Florida A&M University is committed to academic honesty and its core values, which include scholarship, excellence, accountability, integrity, fairness, respect, and ethics. These core values are integrated into this academic honesty policy. Being unaware of the Academic Honesty Policy is not a defense for violations of academic honesty. Additional detail on FAMU Academic Honesty Violations are provided in University Policy 2.012 (10.)(s). If you have any questions, please see your Academic Advisor.

It is the aim of the faculty of Florida A & M University to foster a spirit of complete honesty and high standard of integrity. Anyone caught cheating in any manner is awarded the grade of “F” (No warnings will be given). It is your responsibility...
to do your own work. The use of textbooks, notes, pagers, cell phones, and programmable calculators are not allowed in any quiz or exam. **Both persons collaborating by cheating will receive the Final grade of “F” with offenders also liable to serious consequences, possibly academic suspension.**

The University’s Academic Honor Policy is located in the Student Handbook, under the Student Code of Conduct-Regulation 2.012 section, beginning on page 55-56.

**University Americans with Disabilities Act (ADA) Statement**

The Florida A&M University Americans with Disabilities Act (ADA) Policy Statement sates that “Individuals who need a reasonable accommodation must notify the Office of Equal Opportunity Programs at 599-3076.” It is the responsibility of the FAMU Equal Opportunity Programs (EOP) Office, through the ADA Coordinator, to ensure the Florida A&M University is in compliance with the Americans with Disabilities Act. If you have any questions, please contact your Academic Advisor or the University EOP Officer, Equal Opportunity Programs, 674 Gamble Street, Tallahassee, FL 32307, (850) 599-3076.

All students with disabilities should notify me immediately at the latest before the beginning of the third week of classes. Documentation of disability is required and should be submitted to the Learning Development and Evaluation Center (LDEC). For additional information please contact the LDEC at (850) 599-3180.

**Policy Statement on Non-Discrimination:**

It is the policy of Florida Agricultural and Mechanical University to assure that each member of the University community be permitted to work or attend classes in an environment free from any form of discrimination including race, religion, color, age, disability, sex, marital status, national origin, veteran status and sexual harassment as prohibited by state and federal statutes. This shall include applicants for admission to the University and employment.

**ADDITIONAL CLASS REQUIREMENTS:**

1. Students are required to log in via zoom from the start of the class to the end of the class period.
2. Attendance will be recorded according to zoom time information record. (note: a portion of the grade for this course **MAY BE** directly tie to your final grade). Successful attendance is defined as consistently present to the end (75minutes)
3. Students are required to have the video on while the audio is on mute (unless you have question) throughout the class period.
4. Student can reach me via email for any questions/problems.
5. If you have a question/problem that need my attention, send the question to me via email. I will explain the solution to the problem during the class time, I will also send the solution of the problem to the requestor.

**Procedure for Resolving Faculty-Student Conflicts:**

- Student first attempts to resolve issue with instructor
- Student submits written statement of problem to Departmental chair
- Chair forwards student statement to instructor
- Instructor responds in writing to chair
- Chair meets with instructor and/or student if necessary
- Chair forwards response/recommendation to Dean’s office

**Intent to Grieve Form.** Students must submit Intent to Grieve Forms, online, within **two weeks** of grades being made available for students to view in accordance with the University Registrar’s calendar. Students cannot submit an Academic Grade Grievance without submitting an Intent to Grieve Form unless they receive an exception from the Associate Dean.