



Florida Agricultural and Mechanical University



Tallahassee, Florida 32307

Syllabus

COURSE SYLLABUS

Course Number: CHM 1020 Section number : 003 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	Required Text(s): Nivaldo J. Tro, <i>Introductory Chemistry</i> 6 th ed. Ed., New York, NY, Pearson. Course website: <i>Canvas and Mastering Chemistry Access</i> Supplies: Non-programmable scientific calculator
Faculty Name: Dr. Sanuja Pitigala	Term and Year: Fall 2023 Place and Time: RM 102 Dyson Building, M, W 11.00-12.15pm F 11.00-11.50am
Office Location: 131 Dyson Pharmacy Building	Email: sanuja.pitigalaarach@fam.u.edu

Office Hours	Monday 9.15-10.45am	Tuesday	Wednesday 9.15-10.45am	Thursday	Friday By appointments
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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-1020 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 specific outcomes of the Department of Chemistry for CHM1020, 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 others' ideas through questioning and analyzing, and the skill to synthesize the results into the creative process.
- Evaluate* contextual, numerical and graphical data for validity.
 - 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.
- Read, write, listen to and speak* the language of the sciences.
 - 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.
- Understand* how scientific information is organized.
 - Use information-seeking strategies* necessary to access information efficiently and effectively.
 - 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 Canvas or My lab and Mastering Chemistry (Quizzes and homework).

6. Course Contents:

In CHM 1020, 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
Chapter 10	Chemical Bonding
Chapter 11	Gases

- Chapter 12 Liquids, Solids, and Intermolecular Forces
Chapter 13 Solutions
Chapter 14 Acids and Bases

Instructional Strategies: Combined (Hybrid) pedagogic approaches will be practiced

- a. *Traditional Lecturing.*
- b. *Active Learning*
- c. *Supplimental Instruction*

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

Part-1 Chapter1- 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.

4.5. **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- Chapter12

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's 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**PART-I Chapter 1 - 5**

<p>August 28 Course Overview Introduction to Mastering Chemistry 1.3 Describe the scientific method. 1.4 Analyzing and Interpreting Data 2.1 Scientific Notation 2.2 Measurement and Uncertainty</p>	<p>August 30 2.4 <i>Significant Figures in Calculation</i> 2.5 <i>The Metric System</i> 2.6-9. Dimensional Analysis</p>	<p>September 1 2.10 Density 3.2-3 Classify matter 3.4. Classify matter based on composition 3.5-6 Physical chemical changes</p>
<p>September 6 3.8 Energy and calculations 3.10 Convert temperatures 4.2 Dalton; s model 4.3 The nuclear atom</p>	<p>September 8 4.4 subatomic particles 4.5 Atomic Numbers 4.6 Pattern of periodic table 4.7 Ions 4.8 Atomic mass and masses of isotopes</p>	<p>September 11 4.9 average atomic mass 5.2 law constant composition 5.3 how to represent a compound</p>
<p>September 13 5.4 Element and compound 5.5 chemical formula for ionic compound 5.6-7-8 Naming binary compound</p>	<p>September 15 5.4 Element and compound 5.5 chemical formula for ionic compound 5.6-7-8 Naming binary compound</p>	<p>September 18 5.9-10 <i>Naming acids</i> 5.11 <i>Formula mass</i> <i>Review</i></p>

PART –2 *Chapter 6 - 8*

September 20 EXAM #1	September 22 6.2-3 <i>The Mole, Molar Mass of Compounds</i> 6.4 Mole to gram conversion 6.5 chemical formula as conversion factors	September 25 6.6-7 Percent Composition of Compounds 6.8-9 empirical formula Review Quiz 1
September 27 7.2 Evidence of a chemical reaction 7.3 write chemical reactions 7.4 Balance chemical reactions	September 29 7.5 Aqueous solutions 7.6-9 Types of chemical reactions	October 2 cont. CH 07 8.1-2 Introduction to Stoichiometry
October 4 8.3 Mole-Mole Calculations	October 6 8.5 Mass-Mass Calculations 8.4 Mole-Mass Calculations	October 9 8.6 Limiting Reactant and Yield Calculations 8.7 Enthalpy of a reaction
October 11 Continued CH 08	October 13 <i>9.2-3 Electromagnetic Radiation</i> <i>9.4 The Bohr Atom</i> <i>9.5 Quantum Mechanical model</i> <i>9.6 electron configuration</i>	October 16 9.7-9.8 electron configuration of atoms and their position of the periodic table 9.9 Periodic Trends in Atomic Properties

PART-3 Chapter 9- Chapter 11

October 18 EXAM #02	October 20 10.2 Lewis Structures of Atoms 10.3 L. S. of Ionic compounds	October 23 10.4-10.5 L. S. of Covalent compounds 10.6 Resonance of Lewis structure
October 25 10.7 Lewis Structure of Compounds and Molecular Shape 10.8 Electronegativity and polarity	October 27 11.2-3 Properties of Gases and pressure measurement 11.4 Boyle's Law 11.5 Charles's Law	October 30 11.6 Combined Gas Law 11.7 Avogadro's Law 11.8 Ideal Gas Law 11.9 Dalton's Law of Partial Pressure
November 1 11.10 Density of Gases <i>, Ideal Gas Law and Gas Stoichiometry</i>	November 3 Continued Ch11	November 6 12.2 Properties of Liquids 12.4 condensation, evaporation Boiling and Melting Point
November 8 12.5 Changes of State 12.6 Intermolecular Forces	November 13 13.2 Homogeneous mixtures 13.3 Solubility, Rates of dissolving solids 13.5-7 Concentration of Solutions Colligative Properties	November 15 EXAM #3

PART-4 Chapter 12 – Chapter 14

November 17 Cont. Colligative properties 13.10 Osmosis and Osmotic pressure	November 20 14.2-3 Properties of Acids and Bases, Reactions of Acids and Bases	November 22 14.4 molecular definition of acids and bases
November 27 14.6 Dissociation of weak acids, Electrolytes and Nonelectrolytes	November 29 14.8 Introduction to pH and pOH	December 1 14.9 Dissociation of water/Review
December 06 EXAM #4	December 12-15 FINAL EXAM	

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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:

<u>Activity</u>	<u>Material</u>	<u>Date/Day</u>
Exam 1	Chapters 1- 5	Sep 20
Exam 2	Chapters 6-8	Oct 18
Exam 3	Chapters 9-11	Nov 15
Exam 4	Chapters (12-14)	Dec 6
FINAL EXAM	All chapters	Dec 12-15

EXAMS DATES ARE SUBJECT TO CHANGE

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 SIGNED DEAN EXCUSE SHOULD BE E-MAILED 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.

FOR CEDAR STUDENTS: PLEASE SCHDULE YOUR TEST WITH THE CEDAR OFFICE ON YOUR CLASS'S TEST DATE

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:

Event	% Contribution
Four Hour Exams	4 x 15= 60
Quizzes	10
Homework	10
Final	20
TOTAL	100

Total:	100
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Grade Calculation

Final Grades (%)

A: 88-100, B: 78-88, C:65-77, 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 THURSDAY, NOVEMBER 9

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: 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.

Students with disabilities: 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.

Official Statement: Any student whose disability falls within the American Disabilities Act (ADA) and requires accommodations should contact the Office of Services for Students with Disabilities. The office is located in the Student Service Building Room 204. You may also reach the office by phone at 259-6035.

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. Successful attendance is defined as consistently present to the end (75minutes).
2. Student can reach me in person or via email for any questions/problems.
3. Please use your FAMU mail and mention the course and section number.

Procedure for Resolving Faculty-Student Conflicts:

- ÉStudent first attempts to resolve issue with instructor
- ÉStudent submits written statement of problem to Departmental chair
- ÉChair forwards student statement to instructor
- ÉInstructor responds in writing to chair
- ÉChair meets with instructor and/or student if necessary
- ÉChair 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.

Academic Calendar: Fall 2023

August 28	Classes begin (Full-Time Studies)
September 1	Last day to drop and add
September 4	Labor Day
November 9	Last day to withdraw
November 10	Veteran's Day
November 22- 24	Thanksgiving -No classes for the week
December 8	Last day of classes
Final Exam	Dec 11-15
Convocations	
Friday September 15	President's Convocation 10:10-12:10
Friday October 27	Homecoming Convocation 10:10-12:10