

# Course Syllabus

## Course Information

**Course Title:** General Education Chemistry

**Subject and Number:** CHM 1020

**Course Description:** This course provides the non-science major with an introductory study of the substances central to our daily lives. The students will learn the basic chemistry of nutrition, medicines, cosmetics, household cleaners and the environment.

**Class Number:** LOREM IPSUM

**Term and Year:** LOREM IPSUM

**Course Modality:** [MDC Modalities](https://www.mdc.edu/registration/options/default.aspx)

## Instructor Information

**Name:** LOREM IPSUM

**Department and Campus:** LOREM IPSUM

**Office location:** LOREM IPSUM

**Office hours:** *(communicate course office hours with students)*

**Phone number:** 123-456-7890

**Email:** LOREM IPSUM

**Communication Policy:** *(Faculty will establish protocols for communication with students)*

## Required Textbook, Course Materials, and Technology

**Required course materials:** *(Textbook(s), library reserves, shark pack, and/or other required readings. Include ISBN Number and author(s))*

**List optional/supplemental materials/OER:** LOREM IPSUM

**Technology & Technical Skill Requirements:** *(Technology tools or equipment students need to complete this course are included)*

## Grading Policy & Assessment Methods

*List all activities, papers, quizzes, tests, etc. including grading scale used for final grade calculation. Relationships between the final grade and the learner’s accumulated points or percentages/weights breakdown for each assessment or component of the course grade.*

*Include policy on late submissions.*

*For MDC Live and MDC Online courses, include policy regarding exams (e.g., ProctorU, Respondus Lockdown and Monitor, etc.)*

*If applicable, include guidelines for extra credit.*

**Incomplete Grades:** [View the college’s procedures for Incomplete Grades](https://www.mdc.edu/procedures/Chapter8/8381.pdf)

## Miami Dade College Policies

**Attendance Policy:** *(Faculty include precise statements about illnesses/emergencies/ tardiness, missed assignments/make-up.)*

**Students Rights and Responsibilities:** *Policies addressing academic integrity and plagiarism, code of conduct, grade appeals, religious observations, services for students with special needs, student complaints, and other.*

[For more information, visit the Student’s Rights and Responsibilities page](https://www.mdc.edu/rightsandresponsibilities/)

## Available Support Services & Resources

* [Tutoring Labs and Technology – Learning Resources](https://www.mdc.edu/learning-resources/tutoring-labs-technology/)
* [Virtual Tutoring through Learning Resources or Smarthinking Online Tutoring](https://libraryguides.mdc.edu/BbLTutoring)
* [ACCESS: A Comprehensive Center for Exceptional Student Services](https://www.mdc.edu/access/)
* [Advisement](https://www.mdc.edu/advisement/)
* [Password and Login Technical Support](https://www.mdc.edu/registration/password.aspx)
* [Technical Support for MDC Live and MDC Online Courses](https://www.mdc.edu/online/resources/tech-support.aspx)
* [SMART Plan](https://www.mdc.edu/smart/)

*(Faculty select from the above if applicable and include additional course/campus specific resources)*

## Available Support Services & Resources

* [Public Safety - Services](https://www.mdc.edu/safety/services/)
* [Hurricane and Other Natural Disasters:](https://www.mdc.edu/safety/in-case-of-emergency/) In the event of a hurricane or other disaster, the class follows the schedule established by the College for campus-based courses. Please visit the MDC website or call the MDC Hotline (305-237-7500) for situation updates.

## Course Description

**CHM1020 | General Education Chemistry | 3 credits**

This course provides the non-science major with an introductory study of the substances central to our daily lives. The students will learn the basic chemistry of nutrition, medicines, cosmetics, household cleaners and the environment.

## Course Competencies

### Competency 1:

The student will be able to demonstrate knowledge of the basic methodologies of science by:

* Describing the steps involved in the scientific method.

Learning Outcomes

* Communication

### Competency 2:

The student will be able to demonstrate knowledge of the basic units, calculations, conversions, and measurements that are the very foundation of chemistry by:

* Demonstrating how very large or very small numbers are expressed in scientific or exponential notation.
* Converting ordinary numbers into scientific or exponential notation advice- versa.
* Converting measurements from one metric unit to another using conversion factors.
* Defining density and performing basic density calculations.

Learning Outcomes

* Numbers / Data

### Competency 3:

The student will demonstrate knowledge of matter’s classification, properties, and changes by:

* Comparing and contrasting several properties of the different states of matter.
* Explaining how the interconversion between states of matter can occur as well as describing and naming these processes.
* Identifying the symbols used to represent the most common elements.
* Distinguishing matter as either Apure substance or mixture.
* Distinguishing pure substances as elements or compounds.
* Distinguishing mixtures as either homogeneous or heterogeneous.
* Distinguishing between physical and chemical properties and physical and chemical changes of matter.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy

### Competency 4:

The student will be able to demonstrate knowledge of the basic building blocks of matter by:

* Identifying several properties and general arrangement of the three major subatomic particles (i.e., electrons, protons, and neutrons) of the atom.
* Defining isotopes and describing how various isotopes of a single element differ.
* Identifying the number of protons, neutrons, electrons, mass number, anatomic number that an atom has, given its isotopic symbol.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy

### Competency 5:

The student will be able to demonstrate an ability to understand several of the intricacies of the periodic table by:

* Distinguishing between periods and groups on the periodic table.
* Showing the relationship between position on the periodic table and atomic number.
* Distinguishing elements by using the structure of the periodic table and the periodic law (e.g., metal, non-metal, metalloid, noble gas, representative element, transition element, alkali metal, alkaline earth metal, and halogen).
* Describing the relationship that exists between the number of valence electrons an element has and its group number.
* Describing the relationship between an element’s group number and the ion that it commonly forms.

Learning Outcomes

* Communication
* Information Literacy
* Numbers / Data

### Competency 6:

The student will be able to demonstrate knowledge of electronic structures by:

* Demonstrating the relationship that exists between wavelength, frequency, and energy of electromagnetic radiation.
* Stating the number of electrons that can be accommodated in the main energy levels of an atom.
* Using the Bohr Model to determine the electronic configuration for the first twenty elements in the periodic table.
* Stating the number of valences electrons in an atom.

Learning Outcomes

* Communication
* Computer / Technology Usage
* Numbers / Data

### Competency 7:

The student will be able to demonstrate knowledge of chemical bonding and intermolecular forces by:

* Predicting the bond that two atoms will form depending on where they are located on the periodic table.
* Describing the formation of ions from their parent atoms.
* Describing how and why ionic and covalent bonds form.
* Writing the Lewis electron dot structure of elements, ions, ionic compounds, and covalent compounds.
* Comparing and contrasting ionic and covalent bonding.
* Defining electronegativity.
* Describing the difference between polar and non-polar covalent bonds.
* Predicting bond polarity by calculating the difference in electronegativity between two elements involved in a chemical bond.
* Describing how forces of attraction, such as hydrogen bonding, operate between molecules.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy

### Competency 8:

The student will be able to demonstrate knowledge of the composition, nomenclature, and reactivity of several chemical substances by:

* Identifying what atoms are present in a compound and in what ratio.
* Naming and writing the formula of binary ionic and covalent compounds.
* Naming and writing the formula of common polyatomic ions.
* Naming and writing the formula of ternary ionic compounds.
* Defining a mole.
* Computing the molar mass of substance from the sum of the atomic masses of the elements from which it is made.
* Manipulating conversions between mass and moles.
* Producing balanced chemical equations.
* Identifying the significance of the coefficients in a balanced chemical equation.
* Solving basic stoichiometry problems.
* Applying the Law of Conservation of Mass.
* Comparing and contrasting endothermic and exothermic reactions.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 9:

The student will be able to demonstrate knowledge of the properties and characteristics of water and aqueous solutions by:

* Showing the distribution of water resources on the surface of the earth and how water is recycled in the hydrologic cycle.
* Distinguishing between the components in a solution.
* Distinguishing between the different types of solution (i.e., saturated, unsaturated, and supersaturated).
* Showing how polarity, temperature, and pressure affect solubility.
* Performing mass percent and molarity calculations.
* Identifying several unique properties of water.
* Comparing and contrasting several properties of solution (e.g., freezing point depression, boiling point elevation, osmosis).
* Explaining water hardness and its effects.
* Explaining steps to treat, purify, and disinfect water.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 10:

The student will be able to demonstrate knowledge of acid-base chemistry by:

* Predicting the products and producing balanced equations for ionization reactions of acids, bases, and salts.
* Differentiating between different types of electrolytes (e.g., strong, weak, and nonelectrolytes).
* Comparing and contrasting properties of acids and bases.
* Predicting the products and producing balanced equations for neutralization reactions.
* Describing the interrelationship between pH, pOH, [H+], and [OH-]and the conversion from one to another.
* Comparing and contrasting properties of buffered and unbuffered solutions.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 11:

The student will be able to demonstrate knowledge of the nature and nomenclature of organic compounds by:

* Providing dash structural formulas and condensed structural formulas for various classes of organic compounds.
* Identifying and producing formulas for structural isomers.
* Distinguishing between functional groups (alkanes, alkenes, alkynes, arenes, halides, alcohols, phenols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, and amides).
* Applying the International System of Pure and Applied Chemistry (IUPAC)nomenclature to simple organic compounds.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy

### Competency 12:

The student will be able to demonstrate knowledge of the nature of biomolecules by:

* Comparing and contrasting the properties, sources, caloric value, and dietary and nutritional importance of carbohydrates, lipids, and proteins.
* Comparing and contrasting the composition and properties of nucleic acids.

Learning Outcomes

* Communication
* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 13:

The student will be able to demonstrate knowledge of nuclear chemistry by:

* Comparing and contrasting the relative harmfulness, shielding requirements, and penetrating ability of several types of nuclear radiation emitted from atomic nuclei.
* Producing balanced nuclear reactions.
* Identifying the risks, benefits, disposal, and uses of radioisotopes.
* Solving half-life problems.
* Comparing and contrasting nuclear fission and fusion.

Learning Outcomes

* Communication
* Information Literacy
* Numbers / Data