# Chemistry Course No. 03101 Credit: 1.0

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| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes: Engineering & Applied Mathematics (14.0101); Biochemistry (14.1401); Biomedical (14.0501); Health Science (51.9999)

Course Description: **Introductory Course:** Chemistry courses involve studying the composition, properties, and reactions of substances. These courses typically explore such concepts as the behaviors of solids, liquids, and gases; acid/base and oxidation/reduction reactions; and atomic structure. Chemical formulas and equations and nuclear reactions are also studied.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms |  |
| 1.2 | Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. |  |
| 1.3 | Plan and conduct an investigation to gather evidence to compare the structure ofsubstances at the bulk scale to infer the strength of electrical forces between particles. |  |
| 1.4 | Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changesin total bond energy. |  |
| 1.5 | Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs |  |
| 1.6 | Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. |  |
| 1.7 | Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction |  |
| 1.8 | Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. |  |
| 1.9 | Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. |  |
| 1.10 | Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. |  |
| 1.11 | Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). |  |
| 1.12 | Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

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