

**Core Curriculum  
Course Proposal Cover Sheet**

Department of Chemistry, Geoscience and Environmental Sciences  
College of Science and Technology  
Department Head: Dr. Arthur A. Low

Course Prefix & Number CHEM 102

Course Title Essential Elements of Chemistry

Course Description An introduction to the science of chemistry with a broad overview of the essential elements of chemistry for students intending to become elementary or middle school teachers. The lab portion of the course will mainly consist of activities that may be used in their careers to teach chemical concepts.

**THECB Foundational Component Area for which this course is  
being submitted.**

Life and Physical Sciences

**Checklist:**

Course Proposal Cover Sheet

Foundational Component Area Justification Form

Student Learning Outcome Alignment Form

# **LIFE AND PHYSICAL SCIENCES**

## **FOUNDATIONAL COMPONENT AREA JUSTIFICATION FORM**

Rationale: Please provide a rationale for the course which explains how the course being proposed fits into this component based on the component's description. For your convenience, the overall description and rationale for this component are included below.

Life and Physical Sciences (from THECB Chapter 4: 4.28)

Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method.

Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The following four Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork.

- Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
- Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
- Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions;
- Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

### **Rationale for Inclusion in this Category:**

This course introduces elementary education majors to the fundamental concepts of chemistry and how its concepts are applied to explain various natural phenomena. The scientific method is introduced to the student at the beginning of the course and its application is utilized to introduce the student to many different topics in chemistry in both lecture and lab.

**STUDENT LEARNING OUTCOME ALIGNMENT FORM**  
**Life and Physical Sciences**

**Course Prefix/Number: CHEM 102**

**Course Title: Essential Elements of Chemistry**

**Core Objective: Critical Thinking** CT1: Students will evaluate evidence in analysis, interpretation or arguments

Course SLO(s):

Demonstrate the ability to think critically and employ critical thinking skills.

Demonstrate an understanding of the impact of science on society

Learning Activities:

Lab exercises ask specific questions that make the student think about the subject being discussed in the lab. For example, a lab experiment concerning the composition of ionic compounds gives the students the ability to come up with the formulas of ionic compounds given the charges of the individual ions.

During the course of lecture, specific use of the subject being discussed in the everyday world is discussed. For example, the chemical bonding chapter starts with a discussion of protease inhibitors and how an understanding of chemical bonding led to a treatment for HIV.

Means of Assessment:

Grades on lab experiment data sheets.

Selected questions on exams and homework.

**Core Objective: Critical Thinking** CT2: Students will synthesize varied components of information to form a rational conclusion.

Course SLO(s):

Apply the scientific method in lab experiences to interpret information and draw conclusions.

Demonstrate the ability to make connections between concepts across Chemistry.

Learning Activities:

Specific lab experiments include making observations of various different phenomena. The student will make observations and draw conclusions about what is happening.

Students will be constantly be making connections between the structure of the atom and it's relationship to the properties of the element.

Means of Assessment:

Grades on lab experiment data sheets.

Selected questions on exams and homework.

**Core Objective: Communication** C1: Students will express ideas in written, visual or oral forms to a range of diverse audiences in multiple settings.

Course SLO(s):

Communicate effectively in writing

Learning Activities:

During the lecture periods, each chapter will have a readiness assurance test (RAT's) that is given both individually and in groups of 4. During the team RAT, the group will discuss the questions and decide upon the correct answer collectively.

In selected lab experiments, some questions will have the students express ideals in written form.

Means of Assessment:

Grades on lab data sheets.

Comparison of team results to individual results.

**Core Objective: Empirical and Quantitative** EQS1: Students will gather, interpret or use numerical data/observable facts to arrive at an informed conclusion.

Course SLO(s):

Demonstrate the quantitative skills needed to succeed in Chemistry.

Read and Interpret graphs and data.

Learning Activities:

One lab requires the student to prepare a graph and use it to determine concentration of sugar in a soft drink.

Unit conversions, stoichiometry problems are all examples of quantitative skills

Interpretation of the periodic table in terms of what information it gives.

Means of Assessment:

Grades on lab data sheets.

Selected problems on homework and exams.

**Core Objective: Teamwork** TW1: Students will work in coordination to complete specific tasks.

Course SLO(s):

Students will work in coordination to complete specific tasks.

Learning Activities

In the readiness assurance tests (RAT) process, students take a test over the assigned lecture video first individually (called the *i*-RAT) and then in teams (called the *t*-RAT) constructed based on the results of a survey taken during the 1<sup>st</sup> class day.

Certain lab experiments will have team-based and individual-based components.

Means of Assessment:

Compare the *i*-RAT results to the *t*-RAT results.

Compare the grades for the team-based and individual-based components.

As department head, I will ensure that all faculty that teach this course are aware of the requirements that these core objectives and learning strategies be incorporated into the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

Signature\_\_\_\_\_

We, the undersigned faculty, support the proposed changes to this course and agree to incorporate them into our section of the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

*(Signed document should be kept in department office, listing names below on the electronic document implies acceptance)*