

**Core Curriculum
Course Proposal Cover Sheet**

Department: Chemistry, Geosciences, and Environmental Science

College: Science and Technology

Department Head: Dr. Arthur Low

Course Prefix & Number: CHEM 103

Course Title: Fundamentals of Chemistry

Course Description:

A beginning chemistry course for students in applied sciences who need only one semester of general chemistry. The course includes structure, properties and changes in matter, quantitative relationships in reactions, solutions, equilibrium, pH, buffers and nuclear chemistry. Not recommended for science majors or preprofessional students in health fields. Does not meet prerequisite for CHEM 108-4 or 201-4.

The course consists of three (3) lecture hours per week and two (2) laboratory hours per week for three (3) hours of college credit.

THECB Foundational Component Area for which this course is being submitted.
Life and Physical Sciences)

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:

The inclusion of these objectives into the core curriculum will increase the student's observational and deductive skills, allowing the student increased connectivity between the diverse fields of chemistry. Critical thinking will allow them to unite various themes into a coherent whole. While, empirical and quantitative skills will aid in the collection of data and the organization of data. Communication skills will grant the student the ability to share information and present conclusion in an informative manner. Also, by fostering team work, these objectives will lead the students to form interrelationship skills, which will allow them to function better in situations requiring group cooperation.

STUDENT LEARNING OUTCOME ALIGNMENT FORM
Life and Physical Sciences

Course Prefix/Number: CHEM 103

Course Title: Fundamentals of Chemistry

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

Course SLO(s): Students will solve problems involving chemical principles by the application of data, scientific techniques, and problem solving skills.

Learning Activities: Students are presented problems, both intellectual (Lecture problems) and physical (Laboratory exercises) where they are presented data that they must analyse and interpret to reach a proper conclusion.

Means of Assessment: Students critical thinking will be assessed by a combination of test questions (Lecture) and applied hands-on problem solving (Laboratory). Students will be scored by both if they reach the correct conclusion, and in how they reached the conclusion. 70% of the students are expected to score at least a 60% overall in the lecture exams and 70% on the laboratory exercises.

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

Course SLO(s): Students will draw on techniques from the various fields of chemistry, and the cumulative scientific techniques to draw conclusions from the data presented them, by application of the scientific method and the skills they have learned over the course.

Learning Activities: Students will be presented with problems that require them to utilize all of the methods and techniques they have been presented with during the course.

Means of Assessment: Students will be assessed during the final exam where they will draw on both the lecture and laboratory portions of the course. 70% of the students taking the final exam are expected to score at least 70%.

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): Students are able to clearly and concisely state their observation of chemical phenomenon, as well as present their conclusions from their observations in a manner that is concise and clear for the instructor and their laboratory partners.

Learning Activities: Students are given questions where they describe observations they have made in laboratory. These questions must be answered, in writing, in a manner that details the phenomenon observed. Students are also required to draw conclusions from these observations. Students must then, in writing, explain what their conclusions are and how they reached said conclusions. Also, the students will be expected to compose and turn in a laboratory report (completed outside of laboratory) for one laboratory exercise where they will follow a set of online rules for laboratory reports. The goal of the laboratory report will be to document findings and then to communicate their significance. The student will be graded not only for presentation of data, but for the ability to communicate how and why these results were obtained to the reader.

Means of Assessment: Students will be scored by how accurately they describe the observed phenomenon. Also, they will be scored on their reasoning for reaching conclusions from their observation, and finally they will be scored on how close their conclusions are to the correct conclusion. 70% of the students are expected to score at least 70%. Also, 70% of the students will be expected to score a minimum of 70% on the laboratory report.

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): Students will be instructed on how to perform experiments, collect data, make observations, calculate results, and reach conclusions from these results. The students will then be presented with unknown samples on which they will conduct their own experiments.

Learning Activities: Students will be presented with unknown samples and required to perform data collection, data correlation and analysis. The students will make observation and record their data. The students analyze the data to show detailed calculations to arrive at the results. The students will use the experimental data, observations and results to draw conclusions.

Means of Assessment: Students will have to show the data they have obtained, show how they organized this data, and how they reached their conclusions. 70% of the students are expected to at least 70% in this area.

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

Course SLO(s): Students will work coordinate their efforts during experiments in laboratory to increase efficiency and decrease possible sources of error.

Learning Activities: Students will have laboratory exercise (Experiments 3 and 10), and tests (three per course) where they are unpaired. The students will also have exercises where they are assigned work groups (all other laboratories). The students will be required to work together as teams to complete the assigned exercises.

Means of Assessment: Comparisons between the unpaired laboratories and the paired laboratories will provide information on how the student groups are functioning together. The student's scores from the unpaired experiments (Experiments 3 and 10) will be averaged and compared to the average of two paired experiments (Experiments 5 and 8). The students will receive a score of Unsatisfactory, Satisfactory, or Excellent. If the student's averaged score for the unpaired experiments is greater than the average score for the paired experiment by more than 10%, the student will receive a score of Unsatisfactory (0 points). If the students averaged scores for the paired and unpaired experiments are within 10% of each other, the student will receive the score of Satisfactory (10 points). If the student's averaged score for the paired experiments is greater than the average score for the unpaired experiments by more than 10%, the student will receive the score of Excellent (20 points). It is important to note that this assessment will not be part of the regular class score. Rather it is a form of bonus for every student. If the student receives a score of Satisfactory or Excellent the student will benefit from it. However, a score of Unsatisfactory will not be detrimental to the student. That being said, 70% of the students are expected to score as Satisfactory or better.

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)