CORE CURRICULUM COMPONENT APPLICATION
Texarkana College

Part I: Course Information

Course Type
☒ Existing/Restructured
☐ New Course

Course Prefix & Number: **CHEM 1312**

Texas Common Course Number (TCCN): **1312**

Course Title: **General Chemistry II**

Course Catalog Description

General Chemistry I (4,5,2) Fundamental principles of theoretical and applied chemistry. Topics of study include acid-base theory, kinetics, equilibrium, thermochemistry, electrochemistry, nuclear chemistry, qualitative analysis, and introduction to organic and biochemistry.

Course Prerequisites:
CHEM 1411

Available Online?
☐ Yes
☒ No

Part II: THECB Course Objectives
Upon successful completion of this course, students will:
1. State the characteristics of liquids and solids, including phase diagrams and spectrometry.
2. Articulate the importance of intermolecular interactions and predict trends in physical properties.
3. Identify the characteristics of acids, bases, and salts, and solve problems based on their quantitative relationships.
4. Identify and balance oxidation-reduction equations, and solve redox titration problems.
5. Determine the rate of a reaction and its dependence on concentration, time, and temperature.
6. Apply the principles of equilibrium to aqueous systems using LeChatelier's Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.
7. Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
8. Discuss the construction and operation of galvanic and electrolytic electrochemical cells, and determine standard and non-standard cell potentials.
9. Define nuclear decay processes.
10. Describe basic principles of organic chemistry and descriptive inorganic chemistry.
See attached syllabus.

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Part III: THECB Skill Objectives
1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. Empirical and Quantitative Skills: to include applications of scientific and mathematical concepts.
4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Part IV: Course Student Learning Outcomes (SLO)
Upon successful completion of this course, students will:
1. State the characteristics of liquids and solids, including phase diagrams and spectrometry.
2. Articulate the importance of intermolecular interactions and predict trends in physical properties.
3. Identify the characteristics of acids, bases, and salts, and solve problems based on their quantitative relationships.
4. Identify and balance oxidation-reduction equations, and solve redox titration problems.
5. Determine the rate of a reaction and its dependence on concentration, time, and temperature.
6. Apply the principles of equilibrium to aqueous systems using LeChatelier's Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.
7. Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
8. Discuss the construction and operation of galvanic and electrolytic electrochemical cells, and determine standard and non-standard cell potentials.
9. Define nuclear decay processes.
10. Describe basic principles of organic chemistry and descriptive inorganic chemistry.
See attached syllabus.

Skill Objective:	**Critical Thinking Skills:** to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
THECB Course Objective	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.

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Course Student Learning Outcome	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
General Learning Activities	Students are broken into groups of three to four. The group is told they are testing a method of capturing solar energy to be used in a reservoir to be utilized later. They are to develop a procedure to find the specific heat of the metal samples and determine the mass of the metals necessary to capture 50.0 kJ of energy with only a one degree temperature increase ($1^{o}C$). Each group must develop a detailed plan before they can start the process. The plan must be in writing and available to the teacher and the class. After the plan is developed the group may put it into practice using only the equipment provided. If the plan works, the group produces a report and prepares a presentation. If the plan fails, adjustments are necessary to produce a workable plan. See attached activity.
Assessment ***Must Include Assignment & Rubric***	Grade. See attached rubric.

Skill Objective:	**Communication Skills:** to include effective written, oral, and visual communication
THECB Course Objective	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
Course Student Learning Outcome	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
General Learning Activities	Students are broken into groups of three to four. The group is told they are testing a method of capturing solar energy to be used in a reservoir to be utilized later. They are to develop a procedure to find the specific heat of the metal samples and determine the mass of the metals necessary to capture 50.0 kJ of energy with only a one degree temperature increase ($1^{o}C$). Each group must develop a detailed plan before they can start the process. The plan must be in writing and available to the teacher and the class. After the plan is developed the group may put it into practice using only the equipment provided. If the plan works, the group produces a report and prepares a presentation. If the plan fails, adjustments are necessary to produce a workable plan. See attached activity.

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Assessment ***Must Include Assignment & Rubric***	Grade. See attached rubric.

Skill Objective:	**Empirical and Quantitative Skills:** to include applications of scientific and mathematical concepts.
THECB Course Objective	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
Course Student Learning Outcome	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
General Learning Activities	Students are broken into groups of three to four. The group is told they are testing a method of capturing solar energy to be used in a reservoir to be utilized later. They are to develop a procedure to find the specific heat of the metal samples and determine the mass of the metals necessary to capture 50.0 kJ of energy with only a one degree temperature increase ($1^{o}C$). Each group must develop a detailed plan before they can start the process. The plan must be in writing and available to the teacher and the class. After the plan is developed the group may put it into practice using only the equipment provided. If the plan works, the group produces a report and prepares a presentation. If the plan fails, adjustments are necessary to produce a workable plan. See attached activity.
Assessment ***Must Include Assignment & Rubric***	Grade. See attached rubric.

Skill Objective:	**Teamwork:** to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
THECB Course Objective	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
Course Student Learning Outcome	(SLO #7) Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy,

	and free energy.
General Learning Activities	Students are broken into groups of three to four. The group is told they are testing a method of capturing solar energy to be used in a reservoir to be utilized later. They are to develop a procedure to find the specific heat of the metal samples and determine the mass of the metals necessary to capture 50.0 kJ of energy with only a one degree temperature increase ($1^{o}C$). Each group must develop a detailed plan before they can start the process. The plan must be in writing and available to the teacher and the class. After the plan is developed the group may put it into practice using only the equipment provided. If the plan works, the group produces a report and prepares a presentation. If the plan fails, adjustments are necessary to produce a workable plan. See attached activity.
Assessment ***Must Include Assignment & Rubric***	Grade. See attached rubric.