General Studies Gold Request Form

Consult the General Studies Request FAQ for more information and quick answers.

New permanent numbered courses must be submitted to the workflow in Kuali CM before a General Studies request is submitted here. The General Studies Council will not review requests ahead of a new course proposal being sent to the Senate.

Submission Information

College/School	Department/School
The College of Liberal Arts and Sciences (CLA)	School of Molecular Sciences (CCHEMBIO)

Submission Type

Mandatory Review

ASU Request

Is this request for a permanent course or a topic?

Permanent Course

Subject Code	Course Number	Units/Credit Hours
CHM	114	4

Course Information

Enter the course catalog information, found in the web course catalog or Kuali CM.

Course Title

General Chemistry for Engineers

Course Catalog Description

Chemical principles with emphasis toward engineering. Students without high school chemistry or are chemical engineering majors must enroll in the CHM 113, 116 sequence instead of CHM 114.

Enrollment Requirements (Prerequisites, Corequisites, and/or Antirequisites)

Prerequisite(s): CHM 101 with C or better or ALEKS score of 61 or higher OR Pre- or corequisite(s): MAT 170, 171, 210, 251, 265, or 270 with C or better if completed OR Visiting University Student

Is this a crosslisted course?

No

Is this course offered by (shared with) another academic unit?

No

If this course or topic already carries a different General Studies Gold (not Maroon) designation than the one being requested, please check this box.

General Studies Gold Designation Request

Requested Designation

Scientific Thinking in Natural Sciences (SCIT)

Attach a representative syllabus for the course, including course learning outcomes and descriptions of assignments and assessments.

Draft SYLLABUS_CHM114 SpringC_2025_PMarks.docx

Scientific Thinking in Natural Sciences (SCIT)
Courses in scientific thinking in natural sciences will promote public scientific literacy, which is critical for sound decisions about scientifically infused issues such as climate change. Scientific thinking in natural sciences includes understanding basic science concepts, such as the fundamental behavior of matter and energy, as well as understanding that science is not an encyclopedic collection of facts. Science is a process of exploration that embraces curiosity, inquiry, testing, and communication, to reduce uncertainty about nature. In Scientific Thinking in the Natural Sciences courses, students will engage in the scientific process through lab experiences.

Most of the course content should align with the Gold category learning outcomes.

Instructions: In the fields below, state the assignment, project, or assessment that will measure each learning outcome, and provide a description. The description should provide enough detail to show how it measures the learning outcome. If needed, more than one can be identified.

The proposal does not need to include all course assessments that measure a given learning outcome. The provided assessment should include sufficient detail to allow the subcommittee to make their evaluation. When appropriate, the same assessment can be listed for more than one learning outcome (e.g., a culminating project).

You may provide links to a document (Google Drive or Dropbox) that includes the relevant details for the assessment. **Do not provide links to Canvas shells.**

SCIT Learning Outcome 1: Obtain and interpret qualitative or quantitative data and communicate the findings.

CHM 114 is a 4-credit hour course that includes lecture, recitation and lab. Throughout the course students conduct laboratory experiments that align with lecture content.
Laboratory activities require students to employ measurement techniques to collect experimental data. Students complete assignments where they report and analyze their experimental data.

SCIT Learning Outcome 2: Employ evidence to construct and test scientific hypotheses.

Unit 2 focuses on electrons and chemical bonding. The Unit 2 homework assignments, quizzes and exam include questions that ask students to predict the type of chemical bonding and the polarity of molecular compounds.

Unit 3 assignments ask students to predict structural and electronic properties of solid materials based on composition, bonding and intermolecular forces.

Unit 4 addresses chemical equilibria, thermodynamics, and electrochemistry. The assignments in this unit and the final exam ask students to predict and explain the spontaneity of a reaction in terms of equilibrium, thermodynamics, or electrochemistry principles.

SCIT Learning Outcome 3: Assess the validity of scientific claims using evidence from biological or physical science.

Throughout the course, students apply their chemistry knowledge to solve proposed real-life problems involving pure substances and solutions. Assignments and quizzes include questions with contextual engineering problems.

Unit 4 includes electrochemistry. The assignments and quizzes in this unit require students to predict suitability of the reactions used in voltaic cells which are components of batteries and fuel cells.

SCIT Learning Outcome 4: Create models to explain observable phenomena and understand biological or physical processes in the natural world.

Unit 3 includes a discussion of the behavior of gases. The Unit 3 assignments, quizzes and exam require students to use gas laws and kinetic molecular theory to describe the properties of gases, and to use their knowledge of intermolecular forces to predict properties of liquid and solids.

Unit 1 introduces chemical equations that represent chemical reactions. The Unit 1 assignments, quizzes and exam include questions about the amounts of reactants and products involved in a given chemical reaction, and what would be observed during specific chemical reactions.

SCIT Learning Outcome 5: Communicate coherent arguments using evidence drawn from qualitative or quantitative sources.

Unit 2 focuses on atomic property trends in electron configuration, atomic size, ionic size, ionization energy, reactivity and bonding. The Unit 2 assignments, quizzes, and exam includes questions that ask students to predict relative values for atomic properties and the character of the bonds between atoms.

List all course-specific learning outcomes. Where appropriate, identify the associated SCIT learning outcome(s) in brackets (see below for example). Note: It is expected that a majority of course-specific learning outcomes will be associated with a SCIT learning outcome.

1.Measure, interpret, and evaluate experimental data. (SCIT LO1)
2.Implement chemical concepts, such as chemical equilibria and thermodynamic principles, to predict the outcomes of chemical reactions. (SCIT LO2)
3.Apply an understanding of bonding to describe molecular and extended structures and their properties. (SCIT LO2)
4.Evaluate and solve engineering challenges using knowledge of chemical properties and chemical reactions. (SCIT LO3)

5.Evaluate suitability of chemicals and materials for applications like batteries or fuel cells based on chemical and physical properties. (SCIT LO3)
6.Use models to describe the structure and behavior of the particulate nature of matter. (SCIT LO4)
7.Write and explain chemical equations for reactions, and predict quantities involved in chemical reactions. (SCIT LO4)
8.Evaluate and explain trends in atomic and molecular properties. (SCIT LO5)

Provost Use Only

Backmapped Maroon Approval

No Response

Form Submission - Proposer

Submitted for Approval | Proposer

Ruby Arjona - January 7, 2025 at 3:00 PM (America/Phoenix)

Department Approval

Approved

Chad Borges - January 7, 2025 at 4:10 PM (America/Phoenix)

Tijana Rajh

GSC Coordinator Review

Approved

TJ Robedeau - January 8, 2025 at 8:36 AM (America/Phoenix)

April Randall

Assistant Vice Provost Review

Approved

Tamiko Azuma - January 8, 2025 at 9:17 AM (America/Phoenix)

All required components confirmed.

Pre-GSC Meeting

Approved

TJ Robedeau - January 9, 2025 at 9:17 AM (America/Phoenix)

April Randall

Scientific Thinking in Natural Sciences (SCIT) Subcommittee

Acknowledgement Requested

Ralph Chamberlin

Megha Pillai

Michele Devine

Chao Wang

Ashli Morgan - January 28, 2025 at 6:37 PM (America/Phoenix)

The SCIT subcommittee recommends this course revise and resubmit. With the updated learning

General Studies Council Meeting

Waiting for Approval

TJ Robedeau

April Randall

Proposer Notification

Notification

Ruby Arjona

College Notification

Notification

Amanda Smith

Jenny Smith