

General Education Submission Form

Quite frankly, ever since the quantitative Literacy GE assessment during the 2015-16 academic year it has bothered me that our department has not sought QAR GE approval for our nonmajors *Chemistry, Culture, & Society* course.

First, I think the course meets the QAR GE certification criteria, which read

Students will be able to

1. make use of mathematical (including statistical) models for physical or social systems
-and/or-
compute and interpret numeric data, summative statistics and/or graphical representations;
2. reflect on the strengths and weaknesses of particular quantitative models or methods as tools in the natural and social sciences;
3. be able to interpret, reflect on, and use quantitative models and data in public, vocational, and/or private decision making.

Specifically, students in the CHM 4 course

Make use of mathematical models that describe the behaviour of chemical systems, most notably the experiment-based modelling which culminated in the development of modern atomic theory, mathematical models describing the behaviour of light, geometric models that describe molecular shapes and polarity, stoichiometric models for the calculation of material compositions and chemical reaction outcomes, and thermodynamic models that describe the flow of energy in physical and chemical systems (criterion 1).

Use units, prefixes, conversion factors, and mathematical relationships to assess and calculate scientific quantities and to track mass and energy flows in chemical systems (criterion 1).

Reflect on the strengths and weaknesses of various quantitative models for the fundamental structure of matter, especially in terms of assessing the experimental evidence for atomic views of matter and the plum pudding, solar system, and quantum mechanical models of atomic structure (criterion 2).

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Students will apply relevant scientific, mathematical and logical methods to analyze and solve problems effectively and be able to utilize the results appropriately when making decisions.

Specifically, the following individual CHM 4 SLOs contribute to the meeting of this QAR SLO:

1. You will develop an ability to use the language and symbolism of chemistry to communicate and understand chemical concepts.

This CHM 4 SLO involves the use of mathematical quantities, algebraic symbols and relationships, and the embedding of mathematical relationships in chemical drawings and symbols.

2. You will develop an ability to apply mathematical reasoning to work with scientific quantities; understand how scientific inferences are formed; analyze and calculate the properties of elements, compounds, and reaction systems; interpret trends in the use and impact of chemicals in human society and the wider environment; and, as appropriate, make decisions about the best way to address a chemical problem. The specific quantitative literacy skills you will be expected to demonstrate involve

The representation and interpretations of scientific quantities using units, scientific notation, and prefixes.

The calculation of scientific quantities using proportional reasoning, algebraic analysis, percentages, and fractions.

The representation and interpretation of data using various types of tables and graphs.

The drawing of logical inferences using quantitative scientific data

This CHM 4 SLO describes some specific ways in which CHM 4 students are expected to apply scientific, mathematical and logical methods to analyze and solve proble

5. You will become more aware about how chemical technology impacts human history and culture and understand a few contemporary issues raised by the large-scale application of chemical technology.