

Quantitative Reasoning

Foundation Document Criteria for General Education Certification

REQUIREMENT RATIONALE

The Quantitative Reasoning requirement is designed to fulfill that part of the *Aims of a BYU Education* which refers to: “Quantitative Reasoning—numerical abilities that equip students with the capacity to understand and explain the world in quantitative terms; to interpret numerical data; and to evaluate arguments that rely on quantitative information and approaches” (*Aims*, “Intellectually Enlarging”).

LEARNING OUTCOMES

1. The course should improve critical thinking and problem solving, especially as these apply to quantitative analysis.
2. The course should prepare students to identify and intelligently face problems they encounter later in life that require quantitative reasoning.

COURSE CHARACTERISTICS

Courses designed to satisfy the Quantitative Reasoning requirement share the following characteristics:

1. Each course will be one semester, at least three credit hours, offered at the 100 level, and normally taken in the freshman or sophomore year.
2. Any course designed specifically for students not going on to higher math should have the following characteristics and cover the majority of topics below:
 - a. Strongly relate to real world experiences, often drawing from contemporary society for examples and situations.
 - b. Contrast quantitative and qualitative concepts, including being able to make simple calculations and estimates to put numbers in perspective. This should include the uses and abuses of percentages in the media, understanding the role of uncertainty in most real problems, and understanding issues of personal finance.
 - c. Teach problem solving requiring quantitative reasoning.
 - d. Teach statistical reasoning and a basic primer of statistical concepts used in the modern world. This should include how to interpret statistical graphics, differentiate between association and causation, and understand the principles of variation, central tendency, normal distribution, and statistical inference.
 - e. Teach probability as it is used in everyday society.
 - f. Explain concepts of exponential versus linear functions and their relationship to natural systems.
 - g. Develop understanding of the principles, benefits, and limitations of mathematical models and the widespread application of models in society.

- h. Illustrate applications of quantitative concepts in diverse, non-scientific fields (such as art, business and politics.)
- i. Teach students the use and application of common tools that facilitate quantitative processes (such as spreadsheets, etc.).

This course may be taught in any college that wishes to submit a proposal to the Faculty General Council outlining the nature of the proposed course and certifying that the new course meets the criteria contained herein. Faculty must be willing to engage the students in real world applications of quantitative reasoning with the objective of helping the students to understand and explain the world in quantitative terms.