Quantitative Reasoning.

Requirement: 3 credits. The course should enable students to define a problem, analyze numerical or symbolic information, apply mathematical or logical principles, and integrate quantitative or formal methods into problem solving. This course must be offered by a department or program within the College of Liberal Arts and Sciences. A single course cannot count for both the BA Quantitative Reasoning requirement and the KU Core Goal 1.2 requirement.

Rationale:
The goal of this requirement is to prepare KU college graduates for the social and economic demands of the 21st century. The importance of quantitative reasoning for all citizens will continue to grow in the future. We cannot predict the technology and the work environment that our students will face twenty or forty years from now. Even though manufacturing jobs once required no ~~mathematical~~ quantitative skills and provided a path for those not finishing high school, today, according to a recent ~~npr~~ NPR report (http://www.npr.org/2012/07/10/155837962/for-manufacturing-jobs-workers-brush-up-on-math), manufacturing workers need algebra and trigonometry (level one math requirements). ~~Today, college graduates need more than first level math skills.~~ A recent report on quantitative literacy from the Mathematical Association of America noted that "sociologists draw inferences from data to understand human behavior; biologists develop computer algorithms to map the human genome; factory supervisors use 'six-sigma' strategies to ensure quality control; entrepreneurs project markets and costs using computer spreadsheets; lawyers use statistical evidence and arguments involving probabilities to convince jurors." Courses in disciplines other than mathematics can satisfy the quantitative reasoning requirement. Courses that fulfill the quantitative reasoning requirement should presume a competency equivalent to successful completion of MATH 002, an equivalent ACT/SAT score or an equivalent performance on a placement test. ~~To reach the necessary level of quantitative reasoning, one must first achieve competency in college algebra. To understand and calculate with the formulas of statistics, for example, one needs significant experience with variables and their functional relationships.~~

Appendix:

More and more, ~~mathematical and statistical~~ quantitative reasoning pervades our society and economy. Our students need to be able to define a problem, analyze numerical information, apply mathematical or logical principles, and integrate quantitative methods into problem solving. They need to make judgments based on data, to grasp quantitative relationships in economic and political discourse, and to think abstractly in order to understand the uses and implications of new technology. The ability to comprehend and apply mathematical or logical principles is critical in the study of natural and social sciences. The aim of studying mathematics, statistics or other quantitative subjects is not just to acquire specific skills from these courses, but to understand underlying concepts and develop abstract reasoning skills in the quantitative realm, which can facilitate the acquisition of new quantitative and analytical skills in the future.

~~The quantitative reasoning skills our students need go beyond "college algebra"; indeed, the facility with functions and equations developed in college algebra is a prerequisite to developing these skills. The background for part 2 of the requirement may be demonstrated by completion of a college algebra or pre-calculus course, or by performance on a college readiness or mathematics placement exam, but it is not developed in other college courses. Quantitative literacy courses that do not build on the college algebra background are not able to develop quantitative and abstract skills at the level required. Courses in disciplines other than mathematics can complete the quantitative reasoning requirement, but they must satisfy the specified learning outcome and assume and use the skills developed in college algebra (or demonstrated by college readiness or mathematics placement exams).~~

Among Bachelor's degrees at the University of Kansas, the Bachelor of Arts degree in the College of Liberal Arts & Sciences is unique in its commitment to both breadth and depth of knowledge. Students are expected to pursue a plan of study that includes the humanities, fine arts, natural and mathematical sciences, and social sciences. At the same time they will develop expertise in a discipline. They should acquire general knowledge and skills that will enable them to respond to changing demands and responsibilities in the future. They should be able to integrate their knowledge and use it to think critically about a variety of issues. The BA degree is intended to give graduates the greatest flexibility and choice in future study or career. Many students who begin in the Liberal Arts and Sciences go on to professional schools at the undergraduate, graduate, or certificate level. In many cases, these require specific preparation in ~~mathematics or~~ quantitative subjects.

~~Upon reaching this goal, students will be able to define a problem, analyze numerical information, apply mathematical principles, and integrate quantitative methods into problem solving.~~
MATH 101 does not have to be a prerequisite for a course in quantitative reasoning.

~~To meet this outcome a course must achieve all of the following:~~

~~a) Focus on solving problems using functions and numerical techniques.~~
~~b) Require students to apply mathematical or statistical principles to organize or process numerical information.~~
~~c) Require students to use specific quantitative methods to solve problems, and choose appropriate methods for given problems.~~
~~d) Evaluate student performance in the tasks above and use this evaluation for a supermajority of the final course grade.~~

The courses should, however, presume a competency equivalent to successful completion of MATH 002, an equivalent ACT/SAT score or an equivalent performance on a placement test.

This course must be approved by CUSA and be offered by a department/program within the College of Liberal Arts and Sciences.

Approved Courses (as of 4/24/2019):
ASTR 391, CHEM 130, CHEM 135, CHEM 150, CHEM 170, CHEM 190, CHEM 195, COMS 356, MATH 101, MATH 104, MATH 105, MATH 115, MATH 121, MATH 125, MATH 141, MATH 145, MATH 365, PHSX 114, PHSX 211, PHSX 213, POLS 306, PUAD 332