Ways of Knowing in Quantitative Reasoning

Mission:
Ways of Knowing in Quantitative Reasoning **(WKQR**) courses involve forms of human thought that include analysis of data, problem-solving, and deductive reasoning. A globalized world with complex problems requires graduates to reason abstractly and deductively, understand and analyze data, and be fluent in quantitative problem solving. [All students should encounter these meaningful ideas in mathematics in order to engage the culture.]

Goals:

1. Develop competency in meaningful ideas of mathematics, including deductive reasoning, quantitatively-oriented problem-solving, and analysis of data.
2. Develop an appreciation for and an ability to use quantitative methods as a powerful means for problem solving and decision making.
3. Increase the quantitative and logical reasoning abilities needed for a liberal arts education, the workplace, and informed citizenship.

Objectives:
At the conclusion of a WKQR course, students will be able to

1. Recognize that deductive reasoning is how quantitative disciplines make sense of knowledge;
2. Create, analyze, and interpret basic mathematical and/or statistical models from informal problem statements;
3. Use a variety of mathematical strategies for problem solving;
4. Select and use appropriate mathematical computations, procedures, and tools in problem solving;
5. Communicate mathematical and quantitative ideas;
6. Make and evaluate inferences based on data analysis; and
7. Apply abstract and deductive reasoning appropriately and be able to recognize the reasonableness of their results.

Course Criteria:

1. Courses will be focused primarily on quantitative reasoning through mathematics and/or statistics.
2. Courses will have a stated prerequisite of intermediate algebra or above. (This is the equivalent of the current SPU math placement level A.)*
3. Courses will address all goals and objectives and focus deeply on at least two of the three categories: deductive reasoning, quantitatively-oriented problem solving, and analysis of data.
4. Courses will use appropriate computer-based technology such as spreadsheets or analytical software.

[Notes: * This document is informed by national standards for quantitative reasoning courses. See:

> Committee on the Undergraduate Program in Mathematics. CUPM Curriculum Guide 2004 [Internet]. Washington, D.C.: Mathematical Association of America; c2012 [cited 2012 Mar 8]. Available from: http://www.maa.org/cupm/curr_guide.html
> In particular, "College Algebra" and "Pre-calculus" courses are not considered appropriate for quantitative reasoning courses.

**For our purposes, we define *Quantitative Reasoning* as the ability to analyze mathematical and statistical problems as well as determine processes and tools which can aptly be applied to those problems. *Deductive reasoning* is the process of reaching a conclusion via logic from previously known statements.]