Introduction

FQ courses should strive to impart an appreciation for the relevance and usefulness of quantitative reasoning. We define quantitative reasoning as the ability to apply mathematical concepts to the interpretation and analysis of quantifiable information, expressed numerically or graphically, in order to solve a wide range of problems, from those arising in pure and applied research to everyday issues and questions. It includes the ability to:

- understand and communicate quantitative information using such tools as variables and equations, graphs and charts, words/sentences;
- apply math skills;
- judge reasonableness of results; and
- recognize the limits of mathematical or statistical methods. [Footnote 1]

The primary goal of FQ courses is to teach mathematical reasoning and tools at the college level. While additional course material (natural science, social science, etc.) can serve as a valuable context for learning these skills, it should not overshadow the primary goal.

FQ Hallmarks

To satisfy the Quantitative Reasoning requirement, a course will

1. provide students with theoretical justifications for, and limitations of, mathematical or statistical methods, and the formulas, tools, or approaches used in the course.

2. include application of abstract or theoretical ideas and information to the solution of practical quantitative reasoning problems arising in pure and applied research in specific disciplines, professional settings, and/or daily and civic life.
   - A minimum of 10% of course content (lecture content, homework problems, and exam problems) should include practical examples. Faculty members are encouraged to exceed this.
   - Practical examples might involve a physical situation, professional application, or daily life. Faculty members are encouraged to situate some practical examples in a rich context.
   - Practical examples should be integrated throughout the academic term.
3. **provide opportunities for practice and feedback that are designed to help students evaluate and improve quantitative reasoning skills by including a course component at least once per week with a maximum 30:1 student-to-teacher ratio.**

- *Examples of acceptable formats include, but are not limited to:* small lectures with maximum enrollment of 30 students; large lectures with 30-student-maximum weekly recitation sections, discussion sections, or problem sessions led by trained graduate assistants or trained undergraduate peer-tutors; large lectures with weekly 30-student-maximum supervised computer lab sessions designed to reinforce and practice lecture material.

- *Acceptable training for graduate students and undergraduate peer-tutors may include, but is not limited to,* University and/or Departmental start-of-semester TA training, weekly course TA meetings, or other consistent guidance and supervision by faculty.

4. **be designed so that students will be able to** [Footnote 2]
   a. identify and convert relevant quantitative information into various forms such as equations, graphs, diagrams, tables, and/or words;
   b. select appropriate techniques or formulas, and articulate and evaluate assumptions of the selected approaches;
   c. apply mathematical tools and perform calculations (including correct manipulation of formulas);
   d. make judgments, create logical arguments, and/or draw appropriate conclusions based on the quantitative analysis of data, the assumptions made, the limitations of the analysis, and/or the reasonableness of results; and
   c. effectively communicate those results in a variety of appropriate formats.

- *Individual practical examples will likely emphasize some aspects of this hallmark while omitting others. However, the course as a whole must ultimately address each aspect of this hallmark.*

- *Hallmark 4 is intended to help students identify the major components or factors involved in an analytical problem and determine the arrangement of evidence in evaluating the problem.*

---

The following footnotes are for informational purposes during the approval process. They will be removed in the final version of the FQ Hallmarks:

[1] WASC, the Western Association of Schools and Colleges, published its definition of quantitative reasoning in its 2013 Handbook on Accreditation – see page 52 (Glossary) of the March 2013 edition. The definition of quantitative reasoning is an adaptation from the WASC definition, modified based on feedback received from faculty at UH campuses and information from expert sources.

[2] The statements listed here are adapted from the Association of American Colleges & Universities’ [Quantitative Literacy VALUE rubric](http://www.aacu.org/value/quantlit/rubric/).