

## Request for Quantitative Thinking Designation for a Transfer Course

Macalester College believes that quantitative thinking (QT) skills are an essential component of a liberal education. The breadth of experience associated with a liberal arts education prepares students to be active participants and leaders in government, civil society, business, and academia. Many policy debates, scientific discussions, political issues, and personal and organizational decisions involve judgments about claims based upon quantitative evidence. To evaluate these claims, the individual must have basic familiarity with such concepts as counting, measurement, estimation, and data analysis. Equally important is the capacity to ask and answer questions in a manner appropriate to these quantitative tools and to understand when the use of quantitative tools is or is not appropriate. The purpose of the QT requirement is to ensure that students have the opportunity to develop such skills.

Macalester courses are evaluated for meeting the QT requirement by the degree to which they meet the six specific learning goals described below. Such courses carry one of the following three designations.

**Q1.** Some range of quantitative topics are covered and quantitative thinking elements represent some of the overall material covered.

**Q2.** At least half of the course focuses on quantitative topics and covers at least three of the learning goals.

**Q3.** The great majority of the course focuses on quantitative topics and covers all or nearly all of the learning goals.

### *Learning Goals for Quantitative Thinking Courses*

A. Describing the world quantitatively. Much of quantitative thinking involves quantitative or statistical descriptions of social and natural phenomena. This includes descriptions of patterns, variations and rates of change, such as linear or exponential growth. Understanding descriptive statistics and the various modes of presentation of quantitative data is central. Students should be able to distinguish when quantitative approaches are appropriate and when they are not.

B. Evaluating sources and quality of data. Students of quantitative thinking should understand the sources of data, including the processes of collecting or producing data. This may involve understanding how to assess the reliability and validity of measurements and elements of probability and sampling, including sources of bias and error.

C. Distinguishing association from causation. The quantitative thinker knows the ways that associations between factors are established by observation, experiment or quasi-experiment. It is important to be able to establish the meaning of an association or correlation and learn the protocols for weighing the statistical significance and theoretical importance of findings, including inferring causation.

D. Understanding trade-offs. Most decisions, whether public or private, individual or societal, may be thought of as involving conflicting goals. Much of the debate on public issues involves disagreement about the value of the different goals. Where there are conflicting goals, quantitative thinking offers techniques for weighing the relative impact of policy options. While there rarely is a single correct outcome in the face of such conflicts, quantitative thinkers can bring measure and balance to policy discussion.

E. Understanding uncertainty and risk. Few things in life are certain, and decisions and debate often revolve around unknowns. The quantitative thinker possesses skills that can be used to assess, compare and balance risks, and understands the strengths and limits of these techniques. The quantitative thinker knows that, in the face of the unknown or unknowable, we often rely on conditional statements and probabilities in making decisions and can evaluate conclusions drawn from conditional statements.

F. Using estimation and modeling to evaluate claims and test theories. The quantitative thinker understands that quantities vary over huge ranges: “big” and “small” are not absolute notions but depend on context or scale. Quantitative thinkers appreciate the value and limitations of constructing quantitative models, and that the sensitivity of a model’s results to its assumptions can and should be reported along with the model results.

## Request for Quantitative Thinking Designation for a Transfer Course

Please read the cover page of this form and reflect on the degree to which the course for which you are requesting quantitative thinking designation addressed the six learning goals of the quantitative thinking requirement. Then complete all items on this form and submit it to the Registrar's Office.

Your Name: \_\_\_\_\_ Date: \_\_\_\_\_

College or University: \_\_\_\_\_ Dept: \_\_\_\_\_ Course No.: \_\_\_\_\_

Course Title: \_\_\_\_\_

Instructor: \_\_\_\_\_ Semester and Year Taken: \_\_\_\_\_

Brief Course Description:

Indicate the intended "Q" designation of the course:

- Q1** Some range of quantitative topics were covered and quantitative thinking elements represented some of the overall material covered.
- Q2** At least half of the course focused on quantitative topics and covered at least three of the learning goals.
- Q3** The great majority of the course focused on quantitative topics and covered all or nearly all of the learning goals.

Please list which of the six learning goals (identified by letter) were substantially addressed in this course:

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Please provide specific examples below of how these goals were addressed (attach an additional sheet if necessary). Provide a copy of the course syllabus if available.