Quantitative Reasoning

We provide criteria for two categories of Quantitative Reasoning courses. Most students will satisfy this requirement with a Quantitative Reasoning course. For students who arrive at LMU with a higher level of quantitative literacy, as determined by a placement exam, this requirement may be satisfied by a Mathematical Reasoning course emphasizing more abstract mathematical and computational reasoning, or more advanced methods of quantitative and statistical reasoning.

Criteria for Quantitative Reasoning courses

I. Description of Purpose and Content
The ability to understand and apply quantitative, mathematical and computational reasoning is an important component in the development of independent and logical thinking. Quantitative literacy is also essential for students to become informed citizens. These courses will introduce students to fundamental mathematical knowledge, including an understanding of the nature of mathematics and quantitative and statistical argumentation. Instructors may choose to structure these courses in various ways: the course may develop the quantitative skills as tools to explore a central theme or problem in the instructor’s discipline, or it may teach the skills as independent units of the course. However the course is structured, the final goal is for students to have the quantitative reasoning skills they require to make informed decisions, to understand when these skills should be used (and how they can be misused), and to be able to create and critique arguments using quantitative evidence.

II. Learning Outcomes
To be prepared for later courses using quantitative reasoning, and specifically the courses “flagged” for quantitative reasoning, students completing these courses will:

- Be able to interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
- Be able to represent mathematical information in various ways, such as symbolically, visually, numerically, and verbally.
- Be able to solve problems with a variety of mathematical methods, such as arithmetical, algebraic, geometric or statistical methods.
- Be able to estimate and check answers to mathematical problems in order to, for example, determine reasonableness, identify alternatives, or select optimal results.
- Be able to create and critique arguments using quantitative evidence.
- Recognize the limitations of mathematical and statistical methods.

III. Defining Characteristics
Courses satisfying this requirement must provide explicit instruction in quantitative methods and quantitative reasoning. At least 75% of the grade must be based on evaluated quantitative exercises, such as statistical or graphical analysis of numerical data, or problem solving using mathematical methods.
Criteria for Mathematical Reasoning courses (requires placement via placement exam)

I. Description of Purpose and Content
The ability to understand and apply quantitative, mathematical and computational reasoning is an important component in the development of independent and logical thinking. Quantitative literacy is also essential for students to become informed citizens. These courses will introduce students to fundamental mathematical knowledge, such as an understanding of the nature of mathematics or statistical argumentation. These more advanced courses will either explore more advanced methods in quantitative and statistical analysis, or explore other aspects of logical, mathematical or computational reasoning.

II. Learning Outcomes
In these courses, students will:

- Be able to apply more advanced methods of quantitative, mathematical, statistical or computational reasoning to solve problems.
- Be able to use symbolic languages and systems.
- Be able to create and critique arguments using quantitative, mathematical, statistical or computational reasoning.
- Be able to recognize patterns and use them to formulate conjectures.
- Value analytical, quantitative, and numerical approaches to understanding and solving problems.

Additional outcomes will vary, but may include:

- Understanding techniques of proof and counterexample
- Understanding and constructing algorithms
- Understanding more advanced statistical methods
- Applying mathematical concepts to other disciplines
- Knowing the philosophy and history of mathematics

III. Defining Characteristics
At least 50% of the grade must be based on assignments requiring the use of mathematical, statistical or computational methods.