



THE CORE CURRICULUM MATHEMATICS REQUIREMENT

One course in mathematics or statistics, approved by the Core Mathematics Committee

Rationale

The Greek root of the word “mathematics” refers to learning. Mathematical topics have been at the core of the liberal arts since the logic of Euclid and the Pythagorean sense of number became the foundations of the Quadrivium of the Middle Ages: arithmetic, geometry, music, and astronomy. Mathematics as discovered and constructed presents one of the great achievements of intellectual history, an awareness of which is essential to a liberal education. Mathematical thinking progresses from quantity and pattern to relationship and change, ultimately focusing on abstract logical reasoning and concrete analysis of real-world problems. Mathematics facilitates critical thinking and rational decision-making in an increasingly complex and interconnected world. That interconnectedness is reflected in the connections among the various components of the core curriculum. For example, a strong background in quantitative reasoning is applicable to core courses in the sciences, and mastery of critical thinking and logic skills is essential for studies in the humanities and social sciences.

Statistics is the mathematical science concerned with the collection, organization, analysis, presentation, and interpretation of data. Statistics uses mathematical tools in its techniques and mathematical concepts in its theoretical underpinnings, from design of experiments to probability theory. The society into which our graduates enter is inundated with data - in business, engineering, the physical, biological, and social sciences, with respect to politics, the environment, the economy, and health care. On every newspaper page and in every important conversation of contemporary life, data inform rational discourse and critical decisions. Even the origin of the term “statistics”, signifying the science of the state, speaks to the inextricable link between the various contexts of society and the analysis of data gleaned from those contexts.

Core mathematics courses engage students in mathematical ways of thinking: to provide both particular tools and general habits of mind that reflect discipline, clarity, and creativity. Students will represent quantities and relationships with symbols and formulas, use these representations to model real-world problems, interpret and revise problem solutions, observe commonalities of mathematical approaches to a variety of problems, and apply both deductive and inductive reasoning in the interplay between theory and application.

Core statistics courses prepare students for responsible citizenship as informed users, interpreters, and consumers of data. Students will practice the collection, presentation, analysis, and interpretation of data; learn standard techniques, tests, and tools of statistical observation and inference; understand theoretical foundations for applications; and bring a critical eye to the reception of statistical information based on an understanding of the impact of the design of surveys and experiments on the interpretation of the resulting data.

Ultimately, both the logical and relational thinking of mathematics and the analytical and interpretative skills of statistics are manifestations of the Augustinian sense of the natural drive of reason for understanding of self and of one’s place in the world.

The Mathematical Science Requirement

Students will take one course in either mathematics or statistics, selected from those approved by the Core Mathematics and Science Subcommittee. To satisfy the core requirement in mathematical sciences, a course will provide students an appreciation of both the intellectual tradition and the contemporary immediacy of mathematics and/or statistics. The course should develop conceptual understanding, procedural fluency, and problem-solving capabilities; that is, algorithmic and computational fluency will be informed and supported by a theoretical framework and applied to genuine real-world contexts.

Although any course offered by the Department of Mathematical Sciences will fulfill the core mathematics requirement, the Department will develop core courses specifically targeted for non science/math majors; these courses will be identified in NOVASIS. Courses from faculty in Departments other than Mathematical Sciences may submit proposals to the Core Science and Mathematics Committee for consideration for fulfilling the core Mathematics requirement.

Process

Proposals for Core Mathematics courses will be submitted to the Core Science and Mathematics Subcommittee from faculty via their Department Chairs. The Committee will be comprised of 2 elected and 2 appointed natural and physical science faculty (from AST, BIO, CHM, ENV, PHY), 1 elected and 1 appointed faculty from MAT and/or CSC, 1 faculty (elected or appointed) from the humanities or social sciences, and the Associate Dean for Sciences (*ex officio*). Three committee members will be elected by faculty vote for a term of three years; the other members are appointed by the Dean of the College of Arts and Sciences.

Course proposals will be submitted by the **last Friday in September** (for following year fall semester Core Math courses) and by the **last Friday in February** (for following year spring semester Core math courses). The Committee will review proposals assessing consistency with the Mathematical Sciences in the Core Curriculum rationale. This review may include an iterative component in which additional detail or changes may be requested from faculty. The Committee will make decisions by the last Friday of November (for proposals submitted in September) or by the last Friday in March (for proposals submitted in February). Course proposals may be reviewed every three years to consider their continued relevance to the Core.



MATHEMATICAL SCIENCES IN THE CORE CURRICULUM – COURSE PROPOSAL

- 1. Course Title:**

- 2. Instructor(s):**

- 3. Preferred class meeting frequency for lecture (3 meetings per week for 50 minutes vs. 2 meetings per week for 75 minutes):**

- 4. Course Description for NOVASIS (100 word maximum):**

- 5. Course Description for College website of Core Curriculum courses (250 word maximum):**

- 6. Explain how the course will incorporate the following two elements:**
 - a. Provide students with an appreciation of both the intellectual tradition and the contemporary immediacy of mathematics and/or statistics**

 - b. Develop conceptual understanding, procedural fluency, and problem-solving capabilities; that is, algorithmic and computational fluency will be informed and supported by a theoretical framework and applied to genuine real-world contexts**

- 7. Provide an overview of how student performance will be assessed (exams, lab reports, written and/or oral assignments).**

- 8. Attach a proposed syllabus limited to five pages, which must include a general overview of the progression of the topics to be explored.**