

Course Outline for MATH 3011, History of Mathematics

MATH 3011 History of Mathematics (3 units)

Prerequisite: MATH 248 or [MATH 2031](#) with a grade of C - or better, or consent of instructor; and one upper-division MATH course.

Evolution of mathematics from earliest to modern times. Major trends in mathematical thought, the interplay of mathematical and technological innovations, and the contributions of great mathematicians. Appropriate for prospective and in-service teachers. 3 lectures. Formerly MATH 419.

Course Learning Objectives	
1	Describe how historical perspectives can be used as potential tools to enrich the teaching of secondary mathematics.
2	Broadly describe the development of mathematics related to the content of numeration, algebra, geometry, calculus and number theory.
3	Solve problems using past methods in the content areas of numeration, algebra, geometry, calculus and number theory.
4	Compare and contrast past and current mathematical techniques in the content areas of numeration, algebra, geometry, calculus and number theory.
5	Research and document the interplay between the development of mathematics and the rise of our complex, technological society.
6	Describe ways in which mathematics is continually developing.
7	Research and document ways in which mathematics has developed as a result of human needs and ingenuity.

Expanded Course Content

Textbooks, materials, and/or other resources
1. Burton, David M., The History of Mathematics
2. Cooke, R., The History of Mathematics: A Brief Course
3. Dunham, William, Journey Through Genius
4. Dunham, William, The Mathematical Universe
5. Eves, Howard, An Introduction to the History of Mathematics
6. Laubenbacher, R. and Pengelley, D., Mathematical Expeditions: Chronicles by the Explorers
7. Stillwell, J., Mathematics and Its History
8. Katz, V. A., History of Mathematics, an Introduction

Week	Readings	Topics of Discussion
1	Course Notes	Introduction to numeration systems, African mathematics and early roots of recorded mathematics, the Ishango Bone; Early Greeks (Thales, Pythagoras, Euclid)
2	Katz, Chapters 2, 3, 4, 6	Greek mathematics, including Euclid's Elements, the Euclidean algorithm, Archimedes contributions to mathematics and engineering, Diophantus, and Eratosthenes
3	Katz Chapter 1 and Supplemental Readings	Egyptian mathematics, including the use of hieroglyphics, numeration and doubling/halving, and computations of areas and volumes
4	Katz Chapter 1 and Supplemental Readings	Egyptian mathematics and the Rhind Papyrus
5	Katz Chapter 1 and Supplemental Readings	Mesopotamian mathematics, including the sexagesimal numeration system, Babylonian recording of multiplication, square roots and reciprocals
6	Katz Chapter 1 and Supplemental Readings	Mesopotamian mathematics, including the Plimpton 322 and the square root approximation of the Babylonians
7	Katz Chapters 8 and 9	Contributions of Indian and Islamic mathematicians, to include al Khwarizmi and completing the square, Indian decimal system, and the introduction of zero
8	Katz Chapters 8 and 9	Contributions of Indian and Islamic mathematicians, to include Aryabhata's Stanzas, Brahmagupta, and rules for computing with zero
9	Katz Chapter 7	Chinese mathematics, including rods and counting, arrangement of rods and connection to Pascal's triangle, root extraction and Chinese method for solving systems of equations
10	Katz Chapter 7	Chinese mathematics, including Chinese Remainder Theorem, Qin Jiushao, and the Nine Chapters of the Mathematical Art
11	Katz Chapters 10 and 12	Contributions of earlier European mathematicians, including Viete, Fibonacci, Napier, and Descartes
12	Katz Chapters 10 and 12	Contributions of European mathematicians, including Cardano and solving cubics, Euler

Week	Readings	Topics of Discussion
13	Katz Chapters 15 and 16	Differential calculus and Newton/Leibniz contributions
14	Katz Part IV	Contributions of European mathematicians, including Cantor and the Cantor set, Fermat and Fermat's Last Theorem
15	None	Work on team-based culminating project

Method of Assessment

The possible methods of assessment are written individual examinations, quizzes, in-class worksheets or presentations, projects, and homework. One or more midterms and a cumulative final exam are required.

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Instructional Mode

The instructional mode for this class is face-to-face. This designation means that the essential academic standards of the course require in-class student engagement, and thus remote instruction is not appropriate.