

Departmental Syllabus
**Math 4320 -- History and Development of Mathematical
Concepts**

Textbook: *A History of Mathematics, An Introduction, 2nd ed.*, Victor J. Katz

Prerequisites: MATH 2640 and junior standing or consent of department chair

Calculators: No specific calculator required.

Course Description: A study of the history and development of mathematics from the primitive origins of numbers to modern mathematics.

Course Goals:

At the completion of the course, successful students should...

- ...*know* the contributions of important mathematicians such as Euclid, Newton, Euler, and Gauss.
- ...*use* historical perspectives to understand and communicate mathematics.
- ...*identify* the historic threads that developed into modern courses such as Algebra and Calculus.
- ...*communicate* well in writing about a technical subject.
- ...*understand* the motivations driving the development of mathematics.
- ...*value* mathematics as a major component of human thought.
- ...*use* library resources (including, but not limited to, the Internet) to gather and evaluate information.

Topics covered:

Exact topics covered and order will vary. Some example units might include:

Cardano and the Solution of the Cubic

- Babylonian solutions to algebraic problems
- Greek geometric solutions
- Tartaglia, Cardano, Ferrari, and The Feud
- Cardano's Formula

The Origins of Calculus

- Important Precalculus figures:
 - Eudoxus of Cnidus (408 – c. 355 B.C.E.)
 - Archimedes (287 – 212 BCE)
 - Nicole Oresme (1323-1349)
 - Bonaventura Cavalieri (1598 – 1647 C.E.)
 - John Wallis (1616 – 1703)
 - Pierre de Fermat (1601-1665)
- The Invention of Calculus
 - Isaac Newton (1642-1727)
 - Gottfried Wilhelm von Leibniz (1646 – 1716)
 - Who invented calculus?

The Remarkable Professor Euler

- Basel Problem
 - The Brothers Bernoulli
 - Estimate
 - Solution
- Euler and Number Theory
 - Perfect Numbers
 - The Euclid/Euler Theorem

20th Century Mathematics

- Andrew Wiles and Fermat's Last Theorem
- Paul Erdős, the Man Who Loved Only Numbers
- John von Neumann and the Prisoner's Dilemma
- Gödel's Incompleteness Theorem