



Core Curriculum Supplement

Academic Unit / Office NSM/Mathematics

Catalog Year of Implementation 2017-2018

Course (Prefix / Number) MATH / 4388

Course Title History of Mathematics

Core Proposal Request

Add to Core Curriculum

Revise course already in Core Curriculum

	Current Core Categorization (New additions: select N/A for this column)	Proposed Categorization for Upcoming Core
Foundational Component Area (required)	N/A (Not currently a Core course)	Mathematics (20)
Component Area Option (optional)	N/A (No Component Area Option)	Writing in the Disciplines (81)
Category Listing: Single or Double?	N/A (Not currently a Core course)	List under the Component Area Option ONLY.

Core Proposal Rationale - Please provide a rationale for including, or continuing to include, this course in the UH Core Curriculum:

Request for the addition of MATH 4388 - History of Mathematics - in the Core Category: [81] Writing in the Disciplines. The Department of Mathematics needs to have a MATH course designated as Writing in the Disciplines in order to better serve our Math majors.

Core Objectives

Critical Thinking

Teamwork

Communication

Social Responsibility

Empirical & Quantitative Skills

Personal Responsibility

Please explain how the Core Objectives selected above will be met:

Core Objectives

1. *Critical Thinking*: Students will conduct library research and use databases to research a mathematics history topic of interest, develop a research outline and thesis statement, and write a research paper that will demonstrate critical thinking, inquiry, and analysis, evaluation and synthesis of information.

2. *Communication Skills*: In the research paper assignments listed above, students will demonstrate their ability to effectively develop, interpret and express ideas through writing communication.

3. *Empirical & Quantitative Skills*: Students will demonstrate, through bi-weekly homework assignments and final exams, empirical and quantitative understanding of the development of number systems and geometry that have been employed by various cultures and civilizations throughout the ages.

4. *Social Responsibility*: Students will write a summary paper that addresses issues of social responsibility through consideration of such topics as mathematics and culture, religion, or politics.

Student Learning Outcomes

- Students will understand, through reading, lecture, and written assignments, critical historical mathematics events, such as creation of classical Greek mathematics, and development of calculus.
- Students will recognize through reading, discussion and written assignments, notable mathematicians and the impact of their discoveries, such as Fermat, Descartes, Newton and Leibniz, Euler and Gauss
- Students will develop, through reading and written assignments, an understanding of the development of certain mathematical topics, such as Pythagoras theorem, the real number theory and calculus.
- Students will develop through reading and discussion critical reading and thinking skills.
- Students will improve writing skills and synthesize information through summary and four research paper assignments.

When submitting this proposal form, please remember to attach a syllabus, learning objectives, and/or sample lesson(s).

MATH 4388 - History of Mathematics (Fall 2016, Section 18577)

Instructor: Dr. Shanyu Ji,

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Graders: Minzi Chen (for homework, love4math4ever@gmail.com) and Tyler Williams (for essay, tswilliams7@uh.edu)

Prerequisites: Math 3333 Intermediate Analysis.

Course Description: The history of mathematics and its impact on civilization from the ancient world to modern times, critical events in the development of mathematics, notable mathematicians and the importance of their discoveries. Through biographical, philosophical and sociological perspectives, the course goals are:

- To demonstrate the development of mathematics as a necessary human activity;
- To show that mathematical ideas evolve over time and are subject to change;
- To develop an appreciation of the structure and rigor of mathematics from a historical perspective;
- To introduce the primary literature of mathematics; and
- To solve problems and do mathematics with the historical context.

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Course Content

- **Lecture 1.** The dawn of Mathematics
- **Lecture 2.** Supreme Event: Creation of Classical Greek Mathematics
- **Lecture 3.** Thales, the Originator of the Deductive Method
- **Lecture 4.** Pythagoras Theorem and Pythagoreans
- **Lecture 5.** Four Paradoxes on Motion of Zeno
- *Homework 1 (due date: Saturday 09/03, by 11:59 pm)*
- **Lecture 6.** Three Famous Geometric Construction Problems
- **Lecture 7.** Plato and his Academy
- **Lecture 8.** Eudoxus, Avoided a Fundamental Conflict
- **Lecture 9.** Aristotle and his Profound Influence
- **Lecture 10.** The Elements of Euclid
- *Homework 2 (due date: Thursday 09/15, by 11:59 pm)*
- *Research paper 1 (due date: Thursday 09/15, by 11:59 pm)*
- **Lecture 11.** Apollonius and Conic Sections
- **Lecture 12.** The Alexandria Greek Period and Archimedes
- **Lecture 13.** Diophantus and Diophantine equations
- **Lecture 14.** Decline of Greek Mathematics
- **Lecture 15.** Mathematics of Medieval China
- *Homework 3 (due date: Tuesday 09/27, by 11:59 pm)*
- **Lecture 16.** Mathematics of Medieval India
- **Lecture 17.** Mathematics of Medieval Arabs
- **Lecture 18.** Mathematics in Medieval Europe
- **Lecture 19.** Hindu-Arabic Numeral System
- **Lecture 20.** The Renaissance
- *Homework 4 (due date: Sunday 10/09, by 11:59 pm)*
- *Research paper 2 (due date: Sunday 10/09, by 11:59 pm)*
- **Lecture 21.** The Solution of Third and Fourth Degree Equations
- **Lecture 22.** Napier and Logarithms

- **Lecture 23.** Viète and Modern Algebraic Notation
- **Lecture 24.** Descartes and Analytic Geometry
- **Lecture 25.** Fermat and Fermat's Big Theorem
- *Assignment 5 (due date: Friday 10/21, by 11:59 pm)*
- **Lecture 26.** Early Stage of Projective Geometry
- **Lecture 27.** Calculus — Early Results
- **Lecture 28.** Calculus — Newton and Leibniz
- **Lecture 29.** Bernoulli Brothers
- **Lecture 30.** Euler, Our Master in Everything
- *Homework 6 (due date: Tuesday 11/01, by 11:59 pm)*
- *Research paper 3 (due date: Tuesday 11/01, by 11:59 pm)*
- **Lecture 31.** Lagrange and Laplace
- **Lecture 32.** Gauss, the Prince of Mathematics
- **Lecture 33.** Non-Euclidean Geometry
- **Lecture 34.** Complex Numbers
- **Lecture 35.** Cauchy, Who Set the Foundation of Analysis
- *Homework 7 (due date: Sunday 11/13, by 11:59 pm)*
- **Lecture 36.** Riemann, one of the Most Important Mathematicians
- **Lecture 37.** Riemannian Geometry and the General Relativity
- **Lecture 38.** Abel's Impossible Theorem
- **Lecture 39.** Galois and Galois Theory
- **Lecture 40.** Poincaré, the Last "Universalist"
- *Homework 8 (due date: Saturday 12/03, by 11:59 pm)*
- *Research paper 4 (due date: Saturday 12/03, by 11:59 pm)*
- **Final Exam** (Monday 12/05, 9:00-12:00 noon, AA AUD 2)

Homework

Numerous problems are assigned bi-weekly to provide a wide variety of activities which overlap the course materials and its core objectives. While giving students experiences doing and writing about mathematics, these activities help student evaluate their *Empirical & Quantitative* understanding of the development of number systems and geometry in many cultures and civilizations.

Assigned homework is generally due at midnight on the due date. Homework must be turned into PDF files and submitted 10 minutes prior to the deadline through Blackboard Learn. Late homework is not acceptable.

Essays

The course writing assignments (4 research papers) are intended for students to work on their writing ability within the context of mathematics. All research papers should be typed, doubled-spaced, reasonable margins, font size 11 or greater, 4-6 pages with minimum of thousand words.

Students will conduct library research and use databases to research a mathematics history topic of interest, develop a research outline and thesis statement, and write a research paper that will demonstrate critical thinking, inquiry, and analysis, evaluation and synthesis of information. Students will demonstrate their ability to effectively develop, interpret and express ideas through writing communication. Students will address issues of social responsibility through consideration of such topics as mathematics and culture, religion, or politics.

Please make use of the UH Writing Center <http://www.uh.edu/writingcenter/>. Please write with the intent of showing your readers that mathematics is interesting, not tedious or boring.

Examination

There is one open-notes final exam in form of multiple choice with a few familiar homework problems. The final exam will take place on the campus: on December 5 (Monday), 9:00-12:00 noon, classroom AA AUD 2. To take the final exam, you need to print out all the notes.

Grading

Grading: 35% homework, 45% essays, 20 % Final exam.