MATH 300I: History of Mathematics
Fall 2026

"While the problem of humanization has always, from an axiological point of view, been humankind's central problem, it now takes on the character of an inescapable concern. Concern for humanization leads at once to the recognition of dehumanization, not only as an ontological possibility but as an historical reality. And as an individual perceives the extent of dehumanization, he or she may ask if humanization is a viable possibility. Within history, in concrete, objective contexts, both humanization and dehumanization are possibilities for a person as an uncompleted being conscious of their incompletion. But while both humanization and dehumanization are real alternatives, only the first is the people's vocation."

— Paulo Freire, 1970

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Course Goals

The real goal of this course is to situate the mathematics we think about in a human and historical context. Mathematics may, or may not, come to us out of the air, written on a screen by a godess in our dreams (as Ramanujan reports). Either way, it comes to and by particular people in particular situations, who interact with one another in a Great Conversation through all the ages of human thought.

A student who has completed this course should understand the broad lines of the historical development of mathematics, including periods of thought, cultures, and personalities that have contributed. The student should be able to discuss and write about the philosophical issues surrounding foundations and applications of mathematics.

Course Content

It is not good *history*, but it is good *history of mathematics* to view everything through the lens of where the discipline is now. The major shape of the discipline of mathematics as it is now is the result of the activity of the last 150 years, much of which was structured around the solutions of several problems compiled by David Hilbert in 1900.

For each of Hilbert's problems, we will look at the mathematics, from ancient times forward, that gave rise to a community that could and would think about this problem. We will also look at the work that was done toward a solution of the problem.

In the background of Hilbert's problems, we will see the interaction of religion, culture, philosophy, and mathematics in ancient Egypt, Greece, China, India, and Mesopotamia; the mathematical thought of the Islamic and Mayan traditions; mathematical developments in medieval and early modern Europe; the rise of calculus; concepts of rigor; geometric thinking; and more.

Two major developments that were not adequately foreseen by Hilbert's problems were the involvement of mathematics in scientific computing and the rising sophistication and role of probability and statistics. We will talk separately about these issues.

It is important to note that while European and Euro-American men have collected an outsize share of the credit for modern mathematics, they are not the only ones to have done it. It is easy to be led astray in this point if proper care is not taken. So we will take proper care.

Student Learning Outcomes

At the conclusion of this course, a successful student will be able to:

1. Explain the development of several representative branches of mathematics from antiquity to their present form.
2. Read exposition of mathematics that has not been explicitly covered in previous classes.

3. Account for the impact of social, economic, cultural, and political forces on the development of mathematics.
4. Explain how debates over the content and method of mathematics have shaped the history of who was included and excluded from the mathematical community.
5. Begin to form a professional ethic informed by successes and failures of historical mathematicians.

Course Activities

The class will meet every Monday, Wednesday, and Friday at 12:00 noon. Each day, you will have some material that you must have read. I'll give you the schedule. Read ahead if you need to or want to. Just be sure that you're ready to discuss what you read. Doubtless, we'll spend a significant amount of time just untangling what is meant by specific ideas. But we will also talk about why people did what they did, what alternatives were available to them, and what they thought their work meant.

YOU MUST BE READY TO DISCUSS THE MATERIAL IN CLASS. A portion of your grade will depend on this. "Participation" in class, for the purposes of grading, is defined as attending regularly and for the full time, and regularly making useful contributions to the class discussion. I will inform you by e-mail (whatever address Salukinet has for you) any time I feel that you are in danger of losing points on this, and we can talk about what is needed to correct the issue. You do not put yourself in danger by missing class a single day, or by not having much to say on a single topic.

As part of the preparation for class, you will frequently write surveys of your reading. A more detailed description of this assignment will be provided, but it calls on you to have done some detailed reading (almost always beyond the Yandell book) on the history of the problems under discussion. These surveys will be due at the beginning of class on the first day that the topic is discussed.

You will also write a movie review. A more detailed description of this assignment will be provided.

Each student will complete a significant research project over the course of the term, and will give a presentation on the results on November 20, November 30–December 4, or on the date scheduled for our final exam. More information will be forthcoming.

Cooperation on and frequent discussion of your work is strongly encouraged. Talk with each other, talk with me, talk with friends, use any resource. It is important, however, to be sure that you understand whatever you present.

You are also encouraged to visit me in my office (see note on office hours above) or to call or e-mail me. To be more clear: It's a hard class. I'd like to see you do well in it. I'd love to talk with you and to help you in any way that I can.

Texts:

- B. H. Yandell, *The Honors Class*, AK Peters 2002
- U. C. Merzbach and C. B. Boyer, *A History of Mathematics*, 3rd edition, Wiley, 2011

The texts make a great effort — and a successful one at most points — to be readable. It will provide an important opportunity to get an explanation in a different voice (at times very different) than that of your beloved teacher. In particular, the Merzbach-Boyer book has a lot of deep backgroud information on practically everything.

In all activities for this class, make sure that you *do something*. It is depressing how often students who probably know something relevant to a problem do absolutely nothing, allowing no opportunity to receive credit on the part they actually know.

Grading

Grades will be calculated from the following sources:

Surveys	200
Participation	200
Movie Review	100
Research Project	100
	600 pts

Failure to attend class regularly will certainly adversely affect your grades on each of these factors. For instance, while I do not artificially lower grades for bad attendance, it has consistently held that almost all grades below C- that have been achieved in classes that I have taught have been associated with significant attendance problems.

In all work done for this class, work is more important than answers. A correct answer without correct work (or worse, with work that does not match the answer) is not worth much at all, while generally correct work with an incorrect answer is almost as good as being completely right. Thus, getting the right answer does not guarantee a good grade on the problem, and getting a wrong answer does not guarantee a bad one.

I will make the following guarantees about letter grades. I may decide to lower these criteria (i.e. give a higher grade than the one shown here, if I see that the questions were hard enough that lower numbers more accurately reflect my true standards), but will never raise them.

Percent of total	Grade
90–100	A
80–89	B
70–79	C
60–69	D
≤ 59	E

Student Engagement

At the times announced above under "Office Hours," I plan to be in my office, and my first priority at that time will be talking with my students. I will also usually be in my office most business hours, and if you find me there, I will usually be able to make time for you. You can make sure I'm available by calling or e-mailing in advance.

I will make a serious effort to reply to e-mail within one business day (Monday–Friday, excluding holidays or university closures). If your e-mail is not getting answered in the time you need (whether one business day has passed or not), call me by telephone and I will try to help.

Prerequisites

The prerequisites of this course are MATH 150. This requirement is less severe in this course than it is in many math courses. If you have concerns about your preparedness for this course, be sure to talk with me.

Catalog Description

This course examines how diverse cultures and history from the ancient past to the present have shaped the development of mathematical thought and how developing mathematical ideas have influenced history and society. Particular attention will be given to the evolution of the concepts of number and space; the emergence and applications of calculus, probability theory, non-Euclidean geometries and technology; and to the changes in the concept of mathematical rigor. Does not count towards the mathematics requirements of the mathematics major. Open to all students.

This course provides 3 hours toward the UCC requirement for Humanities.