MATH 300I: History of Mathematics
Fall 2017

"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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Office Hours: Official (guaranteed) hours, Wednesday and Friday 8-9 and 3:00-4:30; Thursday 12-1; also make an appointment or come see me.
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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 century, 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. 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.

Course Activities

The class will meet every Monday, Wednesday, and Friday at 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 December 4, 6, 8, or 11. 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

Be warned. The bookstores have been known to offer some other books as "recommended" for math courses. They are recommended by the bookstore, not by the math department, and not by me. I don't particularly recommend against them (since I have little idea what they'll be), but let the buyer be ware.

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.

I have also asked that several items be put on reserve in the library. These items include several collections of primary documents in mathematics, which will be useful at least in your research project, but also quite possibly in your surveys. They also include both the movie you are to review and the book on which it is based.

The general philosophy is that class sessions and homework will be very hard and tests will be pretty easy (assuming, of course, that you've suffered through the class meetings and homework leading up to them). Again, my goal with the homework is to help you to understand the material so well that you're unhappy with me for giving such a boring (easy) test.

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	300
Participation	100
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

Prerequisites

The prerequisites of this course are designed to save you from spending a semester being miserable and failing this course. *I am on your side, and wish you success. That is why I am telling you this.* To take this course, you must have completed MATH 150.

Any student not meeting these requirements is *strongly* advised to delay taking this class until they are satisfied.

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.

Syllabus Attachment

Fall 2017

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIU embraces a unique tradition of access and opportunity, inclusive excellence, innovation in research and creativity, and outstanding teaching focused on nurturing student success. As a nationally ranked public research university and regional economic catalyst, we create and exchange knowledge to shape future leaders, improve our communities, and transform lives.

IMPORTANT DATES *

Semester Classes Begin:…..……..…….**08/22/2017**
Last day to add full-term course (without Dean's signature): ..…..**08/27/2017**
Last day to withdraw from the University with a full refund:…….**09/01/2017**
Last day to drop a full-term course for a credit/refund:……...**09/03/2017**
Last day to drop a full-term course (W grade, no refund):……..**10/29/2017**
Final examinations: ……**12/11–12/15/2017**

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at http://registrar.siu.edu/calendars. For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at http://registrar.siu.edu/schedclass/index.php

SUMMER SEMESTER HOLIDAYS

Labor Day Holiday 09/04/2017
Fall Break 10/07—10/10/2017
Thanksgiving Break 11/22—11/26/2017

WITHDRAWAL POLICY ~ *Undergraduate only*

Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIU visit: http://registrar.siu.edu/students/withdrawal.php

INCOMPLETE POLICY~ *Undergraduate only*

An INC grade may be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments for the course. An INC must be changed to a completed grade within one full semester (undergraduates), and one full year (graduate students), from the close of the term in which the course was taken or graduation, whichever occurs first. Should the student fail to complete the remaining course requirements within the time period designated, the incomplete will be converted to a grade of F and such grade will be computed in the student's grade point average. *For more information visit:* http://registrar.siu.edu/grades/incomplete.php

REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit more than once. For students receiving a letter grade of A, B, C, D, or F, the course repetition must occur at Southern Illinois University Carbondale. Effective for courses taken Summer 2013 or later, only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned.
This policy will be applied to all transferrable credit in that only the last grade will be used to calculate grade point average. Only those courses taken at the same institution are considered repeats under this policy. *See full policy at* http://registrar.siu.edu/students/repeatclasses.php

GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog at http://gradschool.siu.edu/about-us/grad-catalog/

DISABILITY POLICY

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must contact DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. http://disabilityservices.siu.edu/

PLAGIARISM

See the Student Conduct Code http://srr.siu.edu/student-conduct-code/

MORRIS LIBRARY HOURS: http://libguides.lib.siu.edu/hours

ADVISEMENT: http://advisement.siu.edu/

SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://safe.siu.edu

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: call(618) 453-1492, email siucares@siu.edu, or http://salukicares.siu.edu/

SIU's EARLY WARNING INTERVENTION PROGRAM (EWIP)

Students enrolled in courses participating in SIU's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the Core Curriculum's Overview webpage: http://corecurriculum.siu.edu/program-overview/

EMERGENCY PROCEDURES

We ask that you become familiar with **Emergency Preparedness @ SIU.** Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness @ SIU website, and though text and email alerts. *To register for alerts visit:* http://emergency.siu.edu/

STUDENT MULTICULTURAL RESOURCE CENTER

The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow and succeed. We encourage you to stop by the Center, located in Grinnell Commons, to see the resources available and discover ways you can get involved on the campus. *Visit us at* http://inclusiveexcellence.siu.edu/

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:
Tutoring : http://tutoring.siu.edu/
Math Labs http://math.siu.edu/courses/course-help.php

WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit: http://write.siu.edu/

DIVERSITY

Southern Illinois University Carbondale's goal is to provide a welcoming campus where all of our students, faculty and staff can study and work in a respectful, positive environment free from racism and intimidation. *For more information visit*: http://diversity.siu.edu/#

MILITARY COMMUNITY

There are complexities of being a member of the military community and also a student, and military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at http://veterans.siu.edu/

SIU ONLINE: https://online.siu.edu/

Need help with an issue? Please visit SALUKI SOLUTION FINDER at http://solutionfinder.siu.edu/