Dr. Charles Rocca
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MAT 429/529 - 71: History of Math
On Ground: Higgins 117, MW 2:00-3:15pm
Credits: 3 credit
Grading: Standard A-F

Office Hours:

Office hours for the Spring 2016 Semester are on ground in Higgins 101D.

- MTWF 12:45-1:45 pm
- W 3:30-4:30 pm
- or by appointment

If you need to meet virtually we can make an appointment to do so via my WebEx Virtual Office: Higgins 101-DV (https://westconn.webex.com/meet/roccac)

Course Materials:

- *"Math through the Ages: A Gentle History for Teachers and Others Expanded Second Edition"* by William P. Berlinghoff and Fernando Q. Gouvêa

Course Description:

In this course we will examine significant moments in the development of key areas of mathematics. Particular emphasis will be placed on understanding contributions from a variety of cultures and time periods, as well as from significant individuals.

Learning Outcomes:

After successful completion of this course students will be able to:

- Demonstrate a solid historical perspective on the development of mathematics.
- Highlight how different cultures have approached mathematics, in particular contrasting western (Hellenistic) and non-western heritage.
- Demonstrate knowledge of the lives and contributions of some mathematicians.
- Carry out computations, proofs, or analyses in a way that is historically accurate for a past time.

Additionally, graduate students are expected to be able to:

- Demonstrate in-depth knowledge of the lives and contributions of some particular mathematician.
- Explain clearly in writing how some particular topic in mathematics has changed over time.
- Independently develop knowledge of the evolution of a particular mathematical concept.

Course Content:

Unit 1: Overview of the History of Mathematics

- Text Material: *The History of Mathematics in a Nutshell*, pp. 5-66
- Video: The Story of 1 (In Class)
- Video: The Story of Maths: The Language of the Universe
- Video: The Story of Maths: The Genius of the East
- Video: The Story of Maths: The Frontiers of Space
- Video: The Story of Maths: To Infinity and Beyond

Unit 2: Evolution of Numbers:

- Text Material: Sketches 1 - 5 (pp. 67-102), 17 (pp. 179-186), 29 (pp.271-278)
- Assignment: Sketch 3 - 4 (p.85); Sketch 4 - 4 (p.93); Sketch 5 - 2 (p.101); Sketch 17 - 3 & 4 (p.185); Sketch 29 - 2 (p.277)

Unit 3: Algebra and Calculus:

- Text Material: Sketches 8 - 11 (pp. 115-140), 30 (pp. 279-286)
- Assignment: Sketch 9 - 2 & 6 (p.127); Sketch 11 - 4 (p.139); Sketch 30 - 2 & 3 (p.285)

Unit 4: Geometry Through the Ages:

- Text Material: Sketches 7 (pp.109-114), 12 (pp.141-148), 14-16 (pp.157-178), 19 & 20 (pp. 195-202)
- Assignment: Sketch 7 - 2 (p.113); Sketch 12 - 3 (p.147); Sketch 14 - 3 (p.163); Sketch 16 - 2 (p.177); Sketch 19 - 3 (p.201); Sketch 20 - 5 (p.205)

Grading:

Assignment	Undergraduate	Graduate
Unit Exams	60%	60%
Class Participation	10%	8%
Exploration Packets	15%	8%
Text Assignments	15%	8%
Primary Source Project	10% (Optional)	16%
Total	110%	100%

Exams: At the end of each unit you will have an exam to check your comprehension of the material we covered in class as well as material from the out of class readings and videos. These will be open notes exams.

Class Participation: On the calendar are listed days when *reading* and *videos* are due. On these days you need to complete these prior to class and come in prepared to comment on and ask questions

about these. You should prepare enough comments and questions so that you can contribute something unique not discussed by the other students. These are graded based on completion.

Exploration Packets: During many classes we will work on packets of exercises to help you engage with the material you are learning. These will always be started in class; you need to complete them prior to the next class unless directed otherwise.

Text Assignments: For each of the units 2-4 you will have 5 to 7 problems from the text that you will need to complete and write up. The problems will be listed on the website. Final submissions for all of your out of class assignments must be typed up and in complete sentences.

Primary Source Project: Select an activity from the TRIUMPHS (TRansforming Instruction in Undergraduate Mathematics via Primary Historical Sources) Project which you can learn about here: https://triumphs.ursinus.edu/. For your Primary Source Project you will need to complete one of these projects, then research the history of a typical secondary education mathematics topic and use that research to create a similar project for that topic.

- Select and complete a TRIUMPHS activity from https://triumphs.ursinus.edu/
- Select a topic commonly taught in secondary school (middle or high school) and research the history of the topic.
- Write up the results of your research, you must include a discussion of:
  - Significant dates and events in the development of the topic,
  - Significant individuals involved in the development of the topic,
  - At least two primary sources related to your topic.

  This summary only needs to be about 2-3 pages single spaced plus a bibliography. The bibliography must include a reasonable variety of reliable sources; generally this means not websites or A.I. but actual books and articles from databases.
- Select one of the primary sources discussed in your research and develop 10 to 20 questions that could help a student read and understand the source.
- Combine your research, excerpts from your primary source, and questions into a packet similar to the projects available from TRIUMPHS (https://triumphs.ursinus.edu/). Altogether this should be about 8-10 pages single spaced plus the bibliography.

Course Calendar:

Wednesday	Monday
1/21 **1** Syllabus and watch The Story of One	1/26 **2** Finish The Story of One Reading: Beginnings and Greeks, pp.5-24
1/28 **3** Video: The Story of Maths: The Language of the Universe Packet: Rosetta Stone	2/2 **4** Reading: India and Arabic Mathematics, pp.25-32
2/4 **5** Video: The Story of Maths: The Genius of the East Packet: Square Roots	2/9 **6** Reading: Medieval, 15th & 16th Centuries, and Algebra, pp.33-42
2/11 **7** Video: The Story of Maths: The Frontiers of Space	2/16 Presidents' Day - No Class
2/18 **8** Reading: Calculus and Rigor, pp.43-53 Video: The Story of Maths: To Infinity and Beyond	2/23 **9** Reading: Abstraction, Computers, Today, pp.54-66
2/25 **10** Packet: Exploring the Infinite ***TRIUMPHS Project Due for Primary Source Project***	3/2 **11** ***Unit 1 Exam***
3/4 **12** Reading: Sketches 1-3	3/9 **13** Reading: Sketches 4 & 29
3/11 **14** Packet: Constructable Numbers ***Topic Choice Due for Primary Source Project***	3/16 Spring Break - No Class
3/18 Spring Break - No Class	3/23 **15** Reading: Sketches 5 & 17
3/25 **16** Reading: Sketches 8-9	3/30 **17** ***Unit 2 Exam***
4/1 **18** Reading: Sketches 9-10 ***Write Up Due for Primary Source Project***	4/6 **19** ***Unit 2 Assignment Due*** Packet: Visualizing Quadratics
4/8 **20** Reading: Sketches 10-11	4/13 **21** Packet: Solving Cubics
4/15 **22** Reading: Sketch 30 ***10-20 Questions Due for Primary Source Project***	4/20 **23** ***Unit 3 Exam***
4/22 **24** Reading: Sketches 7 & 12	4/27 **25** ***Unit 3 Assignment Due*** Packet: Approximating π
4/29 **26** Reading: Sketches 14, 19, & 20 ***Rough Draft Due for Primary Source Project***	5/4 **27** Reading: Sketches 15 & 28
5/6 **28** Packet: Exploring Binomials	5/11 **29** ***Unit 4 Exam***

Please note that 3/24/2026 is the day when midterm grades are submitted, 4/13/2026 is the last day students can withdraw from a class, 5/8/2026 is the last day of classes, and 5/11/2026 through 5/15/2026 is final exam week. Finally the ***Unit 4 Text Assignment*** and the ***Primary Source Project*** are Due by 5/15/2024 at 3pm.

End User Agreement:

General Expectations: As a student in this class you are expected to:

- attend class and take notes,
- actively read material in each section, taking notes,
- review your notes on a regular basis,
- check your university email every day,
- check the class site **at least** every other day,
- begin studying for exams in a timely fashion,
- ask questions early and often,
- attend office hours,
- seek help in the math clinic, and
- complete assignments and readings on time.

Assignment Guidelines: (These apply to **all out of class work** done on paper.)

- Work done outside of class must always look neat, legible, and professional, adhering to given guidelines. Work must be very neatly written or preferably typed. The quality of your work will be factored into your grade, up to 10%. In extreme cases work may be rejected and then counted as late.
- An assignment is considered late after I have handed it back or gone over it in class. Late assignments are accepted but may receive at most 75% credit. Late assignments go to the absolute bottom of the stack of papers to be graded; **all on time work is graded before any late work.**
- If you work on an assignment as part of a group, then there may be no more than three individuals in the group and all your names must be on the assignment. You should hand in only one copy of the work.
- All work must be submitted in the manner directed.

Email Etiquette Guidelines: When sending an email you must include the course number and semester in the subject line. For example, if you are taking MAT 314 in Fall 1592 then the the subject line should begin with "[MAT 314 Fall 1592]." Also, you should always begin with a salutation such as "Dear Dr. Rocca" and end with a closing such as "Sincerely, I. Newton."

Technology Use: You are free to use tablets, computers, or voice recorders in the classroom to support the learning of the content, i.e. for note taking, recording, taking pictures of the board etc.. ***Cell phones are not allowed as they are a consistent distraction***. Technology use will be further restricted if it becomes disruptive, a distraction, or invades others privacy.

Exam Makeup Policy: To qualify for a makeup exam you must have a valid reason for missing the exam and, if at all possible, let me know ahead of time that you are missing the exam. You will need to meet with me in order to arrange a time for a make up exam. If you do not have a valid reason, do not give prior notice when possible, or simply do not show up for an exam, you are not entitled to a makeup. If you fail to show up for your makeup exam, you will not be given a second opportunity.

Time on Task: As a 3 credit class you should expect to average 7.5 to 8 hours of work a week including class time. Some weeks you may get away with less and some may require more.

Attendance: Unless otherwise stated, there is no specific policy for attendance in this course. However, if you have **three consecutive unexcused absences** I am required to report to the University that you have **stopped attending**. Also, if you arrive late to class, after I have taken attendance, you are responsible for sending me an email to let me know you were there but late.

Academic Honesty: If on any assignment, quiz, or exam you turn in someone else's work, regardless of the source, as if it were your own you will receive a zero on that assignment, quiz, or exam. If you are caught doing this three times you will receive an F in the course and the Dean will be informed of your academic dishonesty.
(https://www.wcsu.edu/faculty-handbook/2019-2020/policies-pertaining-to-students/academic-honesty-policy/)

Accommodations: If you have need of an accommodation for testing or note taking, please visit AccessAbility Services, located in the HAAS Library room 406 (http://www.wcsu.edu/accessability).

You and Your Grades:

- "A" (Exceptional) range 90% to 100%:
  The student has demonstrated significant mastery of the appropriate knowledge and skills relevant to the course. The student is able to solve standard formulaic exercises and most nonstandard problems which require deeper insight.
- "B" (Good) range 80% to 90%:
  The student has demonstrated mastery of the appropriate knowledge and skills relevant to the course. The student is able to solve standard formulaic exercises and some nonstandard problems which require deeper insight.
- "C" (Adequate) range 70% to 80%:
  The student has demonstrated adequate mastery of the appropriate knowledge and skills relevant to the course. The student is able to solve most standard formulaic exercises but struggles with nonstandard problems which require deeper insight.
- "D" (Inadequate) range 60% to 70%:
  The student has demonstrated inadequate or incomplete mastery of the appropriate knowledge and skills relevant to the course. The student is able to solve some standard formulaic exercises but few if any nonstandard problems which require deeper insight.
- "F" (Unacceptable) below 60%:
  The student has demonstrated essentially no mastery of the appropriate knowledge and skills relevant to the course. The student is unable to solve most standard formulaic exercises and essentially no nonstandard problems which require deeper insight.

Inspire Your Professors:

What to do:

- Show up, on time, ready to learn.
- Ask, and try to answer, questions.
- Put in the time and do the scut work.
- Seek help when you need it, utilize the resources available to you.
- Be an active participant in class and in your own education.
- Be curious about everything and be here to learn.

What not to do:

- Don't ask "What is this good for?" or "Did I miss anything?" or "Does this have to be so hard?"
- Don't say "I don't get *it*."
- Don't fiddle with your phone or computer.
- Don't wander in late and rush out early.
- Don't disappear for extended periods of time in the middle of class.
- Try not to repeat questions that have just been asked and answered, sometimes multiple times.
- Don't just grub for points.
- Don't be a passive passenger to your own education.