

## **MATH 400 History of Mathematics SYLLABUS**

**Prof. Sachs Spring 2018**

**TEXT:** We will use the textbook of John Stillwell, History of Mathematics (3rd edition) which is available online via the publisher Springer in the link I posted on Blackboard.

**COURSE OVERVIEW:** This course is a first course in the history of mathematics. We will focus on the birth of modern mathematics beginning in the Renaissance and continuing to the early 1900's. Topical strands will be pursued in historical fashion and the mathematical developments are tied to social and political contexts where appropriate. Evolving ideas about mathematics, proof, and the major controversies among mathematicians, both personal and mathematical, are part of the cultural history of mathematics. **As a synthesis course**, students will reason analytically about the material, write short essays and a major term paper, and present a brief overview of their term paper orally. Each student will be responsible for leading one part of class discussion as part of a group during the term. Some student works, with names removed, will be copied and provided to the assessment office for use after the course is completed.

**MEETING:** Tues. and Thurs. 3pm – 4:15 pm, Robinson A349

**OFFICE HOURS:** Tues. and Thurs., 10:45-11:45am, Exploratory 4211, and by appt.

**CONTACT INFO:** OFFICE PHONE: 703-993-1464 E-MAIL: rsachs@gmu.edu  
Use headers to avoid spam filtering!

**COURSE WEB PAGE:** Blackboard page at mymasonportal

**GRADING:** The grading scale is as follows, and is based on your correctly rounded semester average. There will likely be no curve. A+: 98+ A: 93 - 97; A-: 90 - 92; B+: 88 - 89; B: 83 - 87; B-: 80 - 82; C+: 78 - 79; C: 73 - 77; C-: 70 - 72; D: 60 - 69; F: 0 - 59 Grading will be fair and impartial. It is based on a mixture of graded homework, which includes short essays, two exams, the term project with oral presentation, and a final exam. Points used as the basis of the grade will be: Homework (200); Two exams (200); Class Participation (50); Term Paper (150); Final (200).

**OTHER POLICIES:** The GMU Honor code is in effect at all times and students are expected to be fully aware of its requirements. Group work may be part of the course, in which case group members will truthfully report on non-contributing members. Absence from quizzes and exams must be for a valid reason and requires prior notification except in extreme circumstances. **DO NOT ARRANGE TO LEAVE BEFORE THE FINAL EXAM.** If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703/993-2474. All academic accommodations must be arranged through that office.

**EXAMS:** Midterm Exams **Tentative** Tuesday, Feb. 27, Tuesday, April 10      Final Exam  
**Definitely** Thurs. 5/10 1:30 pm 4:15 pm

**MATERIAL COVERED AND TENTATIVE WEEKLY SCHEDULE** This schedule is likely too rapid so we will adjust as needed.

1. Introduction. Overview of early math including Greeks. Euclid's Elements. Archimedes. Late Greeks.
2. More Archimedes; Contributions of China, India, Islamic; geometry intersection solution to cubics
3. Italian abacists. Algebraic notation; Logarithms and Decimals.
4. Analytic Geometry; Descartes, Fermat, Pascal. Calculus before Newton and Leibniz
5. Newton and Leibniz
6. Exam 1; More on Newton and Leibniz
7. Differential equations: Bernoullis, Euler. Multivariable calculus. // SPRING BREAK
8. Algebra, Number Theory, Geometry, Topology a la Euler
9. Nineteenth Century Algebra and Number Theory, part 1
10. Exam 2; Nineteenth Century Analysis. Vector calculus.
11. Nineteenth Century Geometry; Gauss, Bolyai, Lobashevsky, Grassmann and Hilbert.
12. Axiomatics, Set Theory, and Topology circa 1900-1930. ( Supplement) Godel and Turing. Von Neumann and computers.
13. Presentations in class. Presentations in class.
14. Presentations in class. Presentations in class if needed. Review.

**GETTING HELP:** You can get help from Professor Sachs during office hours. The library staff is very helpful in finding resources for projects.

**MODIFICATIONS TO SYLLABUS:** I expect to survey the class early on and based on your backgrounds and interests, we may alter the topics significantly. In that case I will redo this document. I fully expect there to be minor changes. The early part is much too fast. I truly welcome your input on topics – this is a great opportunity to explore things you wish to learn.