

SYLLABUS FOR MATH 111, HISTORY OF MATHEMATICS

WINTER 2008

The course will cover episodes in the history of math from antiquity to now. The organization is into themed units which cut across the timeline, rather than an attempt at chronological coverage of a certain period.

Professor: Moon Duchin (mduchin@math.ucdavis.edu)

TAs: Tom Denton (sdenton@math.ucdavis.edu), Ezra Gouvea (ezrag@math.ucdavis.edu)

Lectures: Tuesdays and Thursdays from 1:40-3 in PhyGeo 130

Office Hours: Tuesdays after class and by appointment, MSB 2111

Exam Time: Wednesday March 19, 8:00am

ASSIGNMENT STRUCTURE

Reading A: 30-40 pages per week; one reading response

Reading B: 30-40 pages (more challenging); additional reading response

reading responses are submitted online, due Wednesdays before midnight

Problem Set A: 6-10 problems

Problem Set B: additional 10-20 problems (more challenging)

problem sets are due on Thursdays at the beginning of class

Reading/Writing Track. Reading A and B, Problem Set A, and two reading responses per week. Five page paper due on exam day, with proposal and draft due ahead of final submission. Final exam will test you on reading selections.

Problem Set Track. Reading A, Problem Set A and B, and one reading response per week. Final exam will test you on mathematical concepts.

You have until Thursday January 17 to choose a track for the semester. Extra credit can be earned at any time by completing assignments for the other track.

GENERAL COURSE POLICY

You are encouraged to work together but your written work must be in your own words, and you must indicate working partners and other sources. Academic integrity is taken very seriously in this course; please refer to the Student Judicial Affairs website (<http://sja.ucdavis.edu>) to review University policy with respect to plagiarism and related issues.

Approximate grade breakdown. Problem Set A (20%), Reading Response A (15%), Your Track B (30%), Exam (25%), Participation (10%)

Your participation score comprises factors including class participation, contact outside of the classroom, and the early submission of reading responses.

COURSE OUTLINE

I. Introduction

topics: *Proofs and Refutations*, definitions, theorems, proofs, counterexamples

math concepts: review of basics, polyhedra, $V - E + F$, concepts of topology

II. Artifacts and Algorithms

topics: tablets and papyri, Babylonian and Egyptian mathematics, al-Khwarizmi and the quadratic formula, geography and the transmission of ideas

math concepts: Egyptian multiplication algorithms, the Chinese Remainder Theorem and other early number theory, the Euclidean algorithm

III. Institutions and Abstraction

topics: educational societies and institutions, “Greek” mathematics, Zeno and Aristotle, Islamic mathematics and the House of Wisdom, early European mathematical duels, Cantor and the Church, Noether, Bourbaki, and the new math

math concepts: number and anthypharesis, continued fractions, the cubic formula, notions of infinity and cardinality

IV. Symbol, Formula, Object, Shape

topics: zero, π , trigonometry, early calculus, the development of algebra, Euler, Ramanujan, the story of \mathbb{C}

math concepts: trig formulas, infinite series, the complex plane and its motions

V. People and Mathematical Practice

topics: Galois and the cult of genius, Poincare vs. Hilbert, conjecture and aesthetics, “pure math”

math concepts: groups and geometry, Hailstone numbers, the zeta function, the Prime Number Theorem, the Riemann Hypothesis