

Syllabus

Math 295: History of Math

Instructor: Steve Kennedy

Office: CMC 222, ext. 4333

Office Hours: MW 4a, Tu 2:30-3:30, F 2a

Course Content: We are going to study, in some detail, the discovery, evolution and ultimate acceptance of complex numbers by the mathematical community. We are going to do that by study of primary and secondary literature. It is difficult to read three-hundred-year-old mathematics. The writers had notations, conventions and, most importantly, conceptions different from ours. That is the point --- we want to learn about those differences and how our present notations, conventions, conceptions evolved to their current state of perfection.

Course Structure: The reading list and schedule are below. Each day we will all read the assigned reading. Two students are assigned to each reading; they are to become the “experts” on that reading and will lecture on it for one-half of the class period. That lecture will usually consist of careful working out of examples in the reading and presentation of proofs with thoughtful exposition of the point of view of the author. Each student will serve three stints as expert. You should start immediately getting acquainted with your first expert assignment. It will take several readings to get the level of detailed knowledge you will need to lecture for one hour on it.

Everyone is expected to do every reading and to participate in the class discussion by posing informed questions and offering intelligent comments to the experts.

Grading: Your grade will be determined by (i) your performance and perceived expertise on your assigned readings (15% each), (ii) your performance on the midterm examination which will occur during week six (20%), (iii) your final project (25%), and (iv) your class participation and attendance (10%). The final project will consist of a twenty-five minute presentation and a ten-page paper on a topic of your choice. I will provide a list of possible topics, but you are encouraged to seek out your own in the library and on the internet. We will discuss this in more detail, and the nature and form of the midterm, as the relevant dates approach.

Readings:

Stedall, Jacqueline, *From Cardano's Great Art to Lagrange's Reflections: Filling a Gap in the History of Algebra*; European Mathematical Society, 2010. (Buy)

Wardhaugh, Benjamin, *How to Read Historical Mathematics*, Princeton, 2010. (Buy)

Cardano, Girolamo; *The Great Art*, (translated by TR Witmer), MIT Press, 1968
Dover reprint 1993. Chaps. 1-5, 11-14, 17, 37, 39 (excerpt). (Copies from SK)

Bombelli, Rafael, *L'Algebra*. (secondary source, from Math Intelligencer, copies from SK.)

Viète, Francois, *The Analytic Art* pp.11-32, pp. 159—183, pp. 322-333, pp. 344-348
(thm 3 p. 174 is angle trisection!) (Copies from SK)

Descartes, Rene, *Geometry*, available for download at
<http://archive.org/details/geometryofrene00desc>

Wallis, John, *A Treatise of Algebra, both Historical and Practical*, (available for download from Early English Books Online)

Newton, Isaac, *Universal Arithmetick*, available from Google Books start on page 145 (his numbering) to 184 (postboys) then restart at 347 and go to 361

Euler, Leonhard; *Elements of Algebra*, Springer-Verlag 1984:
pp. 38-44, 186-189, 216-229, 244-288. (copies from SK)

Euler, Leonhard, *Investigations on the Imaginary Roots of Equations*, E170,
translated by Christine Stevens, available at Euler Archive. 1—20 (pp.1-13) and 60-
- 78, (pp. 32-40).

deMoivre, Abraham, *On the Reduction of Radicals to More Simple Terms* (copies from SK))

Wessel, Caspar, *On the Analytical Representation of Direction; An Attempt*,
excerpted in *Smith's Source Book* pp. 54—67 (copies from SK)

Argand, Jean Robert, *Imaginary Quantities*, available in translation from Google books (and in French from Gallica for the adventurous)

Schedule

Week One:

Day 1: Overview

Day 2: Read Wardhaugh

Week Two:

Day 3: Chapter One Stedall A, B
Cardano Chaps 1-5 C, D (NEXT TIME
ADD CHAPTER 6)

Day 4: Cardano Chaps 11-14, 17, 37 G,
H (THIS WORKED WELL)
Cardano pp. 237—243 (biquadrate)
and Bombelli E, F (TWW)

Week Three:

Day 5: Stedall Chap. 2 P, J
Viète pp. 11—32 K, Q (THIS READING
WAS TOO THIN)

Day 6: Rider
Dumbaugh

Week Four:

Day 7: Viète pp. 159-183, pp. 322-
333, 344-348 A, D
Descartes Book 3 pp. 152-192 B, C

Day 8: Descartes Book 3 193--220 E,
O, M
Wallis pp. 171—175, pp. 264--269 F,
N (Not much here, and, of course, it's
incorrect—Add something next time)

Week Five:

Day 9: Stedall Chap 3 H, Q
Newton pp. 145---184 (his
numbering) J, K (This IS WRONG

PART of Newton to read—See
STEDALL Chap 5!)

Day 10: Newton pp. 347—361 M, P
Euler pp. 38-44, 186-189, 216-229 N,
O

Week Six:

Day 11: Midterm

Day 12: Euler pp. 244-288 A, E
Euler E170 1—20 (pp. 1-13) and 60—
78 (pp. 32-40) B, H (Could read more
of THIS, see Stedall Chap 4/5, Also in
wrong order—read deMoivre and
Stedall first)

Week Seven:

Day 13: Stedall Chap 4 C, G
Stedall Chap. 5 D, K

Day 14: deMoivre Q, M (This is
anachronistic here—READ earlier and
find more selecta)
Wessel J, N

Week Eight:

Day 15: Argand Part 1 F, O
Argand Part 2 G, P

Day 16: Students A, B, C

Week Nine:

Day 17: Students D, E, F, G

Day 18: Students H, I, J

Week 10:

Day 19: Students K, L, M, N

Day 20: Students O, P, Q