History of Mathematics Syllabus

Instructor: Dr. Chuck Garner

Textbook: William P. Berlinghoff and Fernando Q. Gouvêa. *Math Through the Ages, expanded second edition*, Mathematical Association of America, 2015, $60.50

Course Description: This course is designed to provide a college-level experience in mathematics and its history. Students will understand the development of certain mathematical topics such as calculus, geometries, algebras, and probability; recognize the contribution of notable mathematicians to the mathematical sciences and recognize the impact their discoveries had on the course of history; recognize the connectedness of supposed separate mathematical disciplines; compare and contrast the mathematical influences on the sciences; apply ancient techniques of problem solving to gain an appreciation for the current state of mathematics and to understand how different cultures have affected the development of mathematics.

Evaluation is a point-based system.

4 Short Assessments (each 50)	200
16 Problem Sets (each 50)	800
2 Projects (each 150)	300
1 Research Paper	150
Discussion Posts (each 100)	400
Total Points	1850

You should plan on completing (at least) 1500 points worth of assignments, and you choose which assignments you want to complete. Your grade will be based on the total points you earn:

Earn at least this many points. . .	. . . and you will receive this grade.
1300	A
1150	B
1000	C

Obviously if you earn less than 1000 points, you will receive an F. Points earned within a grade range will be converted to a proportional grade out of 100. For example, if you earn 1225 points, which is half-way between the cutoffs for a B and an A, that will translate to an 85, which is half-way between an 80 and a 90.

Problem Sets: A Problem Set will be released nearly every Monday and due the following Sunday at 10 PM. If the Problem Set is turned-in before the Sunday night deadline, the points you earn on that Problem Set are multiplied by 1.5. If you are the only person to give the correct solution to all parts of a problem on a particular Problem Set, the points you earn for that problem will be doubled. Solutions to the Problem Sets will be posted once all are turned in, or when the 10-school-day late-work deadline has passed, whichever comes first. There are no make-up Problem Sets.

Short Assessments: Two of these will be released on `ItsLearning` after the mid-point of the semester, and the other two towards the end of the semester. They will be due the next day, and then the 10-school-day late-work policy applies. You will have three attempts

to earn all the points on each assessment; the greatest point total out of your attempts is the one that counts.

Research Paper: A rough draft is due 15 days before grades are due at the end of the semester; the final draft is due the day before grades are due at the end of the semester. (If the rough draft is done well enough, you do not need to submit a final draft.) The paper is a biographical sketch of an mathematician to be selected from the list below. You must tell me your selection since no one else may claim it. In writing your paper, you are to follow the directions for Project #1 in the text on page 63. Notes and answers to any questions in parts (a) through (e) should be answered on the second "notes" page, and part (f) is the one-page paper itself. Your references must include The MacTutor History of Mathematics archive, and the textbook if you answer "yes" to part (a). You must also include at least two other references. The paper is not to exceed one page, with one additional page to be used only for answers to the questions found on page 63, notes, and references. The paper is structured as follows: The heading is to be "Your Mathematician by Your Name", one line skipped, then the body of the paper. The body of the paper is to be single-spaced in 12-point **Times Roman**, with 1-inch margins all around. These are all the instructions you will receive concerning the research paper.

Project: Your projects must be selected by April 28; if you have not selected both projects by the end of class on April 28, one or both will be assigned to you. The project is due by May 14 at 10 PM on `ItsLearning`; the 10-school-day late-work deadline is May 28 at 10 PM. You are to choose two of the Projects found in the textbook, and your choices must be approved by me. (Projects are found on pages 63-66, and at the conclusion of each Sketch.) Projects are assigned on a first-come first-served basis; I will begin asking for the projects you would like to do after Spring Break. Each person must individually complete a different project. The project paper must not exceed two pages of single-spaced type in 12-point **Times Roman**, using 1-inch margins. One additional page of notes and references is allowed. These are all the instructions you will receive concerning the projects. (Note: Project #1 on page 63 is not eligible to be selected as a project.)

Discussion Posts: These will be moderated discussion posts on `ItsLearning`. You are expected to adhere to general guidelines for appropriate responses and initial postings, as listed here. Your "Discussions" grade will be determined by my evaluation of a rubric (below). This grade will be assessed on the day after the last A-day in February, March, April, and May, reflecting your contribution to the discussions over the respective month. Discussion post topics will be guided by the reading assignments. There is no late-work submission that will change or alter these grades, as this assessment is a continual, progressive process.

Resources: All class presentations and Problem Sets will be posted on the History of Math page of my website, `http://www.drchuckgarner.com`. Solutions to the Problem Sets will only be posted to the class page on `ItsLearning`.

Final Exam: There will unfortunately be a Semester Exam for those who do not exempt it. It will not be easy.

This syllabus provides a general plan for the course; deviations may be necessary.

Discussion Posts Rubric

Adapted from the rubric at the University of Wisconsin-Stout, found here.

Criterion 1: Critical Analysis, 30 points

Exemplary: Discussion postings display an excellent understanding of the required readings and underlying concepts including correct use of terminology. Postings show a synthesis of learned ideas. (28-30 pts)

Proficient: Discussion postings display an understanding of the required readings and underlying concepts including correct use of terminology. (21-27 pts)

Limited: Discussion postings repeat and summarize basic, correct information, but do not consider connections between ideas. (14-20 pts)

Unsatisfactory: Discussion postings show little or no evidence that readings were completed or understood. Postings are largely personal opinions or feelings, or "I agree" or "Great idea," without supporting statements with concepts from the readings. (0-4 pts)

Criterion 2: Participation, 30 points

Exemplary: Discussion postings actively stimulate and sustain further discussion by building on peers' responses. Discussion postings are distributed throughout the month (not posted all on one day or only at the beginning or only on the last day of the month). (28-30 pts)

Proficient: Discussion postings contribute to the class' ongoing conversations as evidenced by affirming statements, asking related questions, or making a supported oppositional statement. Respond to most postings of peers within a 72-hour period. (22-27 pts)

Limited: Discussion postings sometimes contribute to ongoing conversations as evidenced by affirming statements, asking related questions, or making a supported oppositional statement. Respond to most postings of peers after several days. (14-21 pts)

Unsatisfactory: Discussion postings do not contribute to ongoing conversations or respond to peers' postings. There is no evidence of replies to questions. Discussion postings are at midpoint or later in the month or only posted on the last day of the month. (0-8 pts)

Criterion 3: Etiquette, 20 points

Exemplary: Postings show respect and sensitivity to peers' gender, cultural and linguistic background, sexual orientation, political and religious beliefs. (19-20 pts)

Proficient: Postings show respect and interest in the viewpoints of others. (16-18 pts)

Limited: Some of the postings show respect and interest in the viewpoints of others. (12-15 pts)

Unsatisfactory: Postings show disrespect for the viewpoints of others. (0 pts)

Criterion 4: Quality of Writing and Proofreading, 20 points

Exemplary: Written responses are free of grammatical, spelling or punctuation errors. The style of writing facilitates communication. (19-20 pts)

Proficient: Written responses are largely free of grammatical, spelling or punctuation errors. The style of writing generally facilitates communication. (16-18 pts)

Limited: Written responses include some grammatical, spelling or punctuation errors that distract the reader. (12-15 pts)

Unsatisfactory: Written responses contain numerous grammatical, spelling or punctuation errors. The style of writing does not facilitate effective communication. (0-11 pts)

Mathematicians for the Research Paper

Al-Battani	Al-Kāshī	Al-Samaw'al	Emil Artin	Roger Bacon
Rafael Bombelli	Sylvia Bozeman	Girolamo Cardano	Mary Cartwright	Nicholas Chuquet
Ingrid Daubechies	John Dee	Annie Easley	Levi Ben Gerson	Felix Hausdorff
Grace Hopper	Katherine Johnson	Camille Jordan	Gottfried Leibniz	Liu Hui
Francesco Maurolico	Robert Moses	Otto Neugebauer	William Oughtred	Pappus
Claudius Ptolemy	Francis Su	Terence Tao	Chelsea Walton	Dudley Woodard

History of Mathematics Reading Assignments

	Lecture	Reading
1	An Introduction: Why History of Mathematics?	Sketch 1
2	The First Computations	Sketch 9
3	Two Mysteries: Pyramids and Greeks	pp.1-14
4	The First Great Theorem	Sketch 12
5	Those Inconvenient Incorrigible Incomparable Incommensurables	Sketch 4
6	Order From Chaos	Sketch 15
7	The Mathematician's Bible	*The Elements*
8	The Impact of *The Elements*	Sketch 14
9	The Thinker and the Thug	Sketch 7
10	A Look Toward the Heavens	pp.15-24
11	And Now, Everything Changes	pp.25-32
12	The House of Wisdom	Sketch 10
13	The Blockhead	Sketch 2 and pp.33-35
14	A New Viewpoint	Sketch 5
15	From a Different Perspective	Sketch 20
16	The Printer, the Stammerer, and the Gambler	Sketch 8
17	The Solution of the Cubic	Sketch 11
18	Napier's Bones	Sketch 27
19	On the Shoulders of Giants	Sketch 26
20	A Fly on the Wall	Sketch 30
21	Fluent in Fluxions	pp.43-47
22	The Master of Us All	Sketch 18
23	The French Revolution	Sketch 21
24	The Prince of Mathematicians	Sketch 17
25	Arithmetical Investigations	Sketch 22
26	A Crisis in Geometry	Sketch 19
27	A Strange New World	pp.48-53
28	A Flash of Genius	Sketch 23
29	Algebra is Geometry	Sketch 24
30	Fixing the Foundations	Sketch 29
31	Infinitely Many Infinities	Sketch 25
32	Mathematics as Theology	pp.54-62
33	A Mathematician's Apology	Sketch 13