Syllabus for MAT52-843-01
Seminar: History of Mathematics

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Office Hours: Monday and Wednesday 10:15-11:30, Thursday 2-4, or by appointment.


Aims of the Course:
1. To give additional life to your knowledge of mathematics.
2. To provide an overview of mathematics -- see how your various courses fit together and see where they came from.
3. To enhance your skills in using the library and the internet for mathematics.
4. To show that mathematics is part of our culture.
5. To indicate how one might use the history of mathematics in future teaching for those who intend to teach.
6. To improve your reading and analytic skills, especially in a technical situation.
7. To improve your oral and written communications skills in a technical setting.

Course Description: The first five weeks of the seminar will be concerned with early developments in mathematics with a strong Greek emphasis. Egyptian, Macedonian, and Mayan number systems will be discussed. Other key topics and mathematicians will include the axiomatic method, Thales, Pythagoras, Euclid, Archimedes, Apollonius, Ptolemy, Diophantus, and Hypatia. The text source will be Chapters 1-4. We will then spend three weeks on selected topics from Chapters 7-9 in our text that deal with Medieval and Renaissance mathematics. Topics will include algebra, astronomy, trigonometry, and geometry. Special emphasis will be on the development of algebra through the Islamic world and through the Italian mathematicians. We then spend three important weeks on the development of Calculus in the seventeenth century. Chapters 10 and 11 will provide textual reference. We conclude with analysis, statistics, and geometry in the nineteenth century, and, if we are lucky a look at twentieth century developments. This latter portion of the seminar will reference selected topics from Chapters 13-19 in the text. Obviously we cannot be exhaustive of this vast history; rather, we'll be on a guided tour of the material hitting some of the intellectual highlights. By far the most important part of this course will be the work that you do daily, both in and out of class, on your own and with others.

Course Grade: We decided at our first class meeting on a reasonable grading scheme for this seminar type course. Class Participation 40%, Research Paper 30%, Two Essays 20%, and Assigned Presentations (such as Weekly Web Assignment, 2 or 3) 10%. I will compile a profile or history of class members' contributions to the seminar each week in order to establish a sound basis for the quality of participation grade. I would be delighted to talk with you near mid-semester regarding your work up to that time.
**First Assignment:** Your first assignment is to email an automathography to me. You are to introduce your mathematical self. Tell me about the math courses you have taken, what were your favorites and what topics did you enjoy most, what did you find most difficult or least fun. Explain what your mathematical interests are, and what you plan to do after graduation. Reveal why you signed up for this course and what you expect to get out of it. If you have any anxieties about this course, or if you have any special problems or needs, let me know. You are encouraged to be creative in your response; don’t be pedantic and just answer the questions asked above; include whatever you wish. This is a chance to showcase your writing skills as well as to introduce yourself to me. Feel free to mention particular interests, likes, dislikes, eccentricities, . . . beyond your mathematical self.

My email address is chapmanj@southwestern.edu. This assignment is due no later than Sunday, 18 January.

**Weekly Web Assignment:** The Saint Andrews (UK) web page (MacTutor) is a great math history source. Among other items it has births and deaths of mathematicians, usually with a very brief bio and a picture, by calendar date. For each date that we meet a member of the class on a rotating basis is to select a mathematician whose birth day corresponds to the date of our class meeting and to introduce this mathematician to the class. This introduction should include the picture of the mathematician and a sketch of the life and mathematical contributions of the person. The sketch should contain more information than the very brief one on the web page, and the copies of the picture and sketch should be available for each class member. A second member of the class, again on rotating basis, will follow the same routine for a mathematician whose death day corresponds to our class day.

www-gap.des.st-and.ac.uk/~history/ or search history of mathematics on Yahoo.com and the first entry will probably be MacTutor.

**Research Paper:** You are to write a paper on a topic of your choice. This is meant to be an interesting and enjoyable assignment, not (at least not merely) a chore. So choose a topic with care. I will be delighted to discuss topics with you, perhaps you recall some of the previous research papers that we viewed the first day of class. I would like each of you to give me your topic by March 10 and a preliminary one page report by 7 April. The final version of your paper is due no later than 28 April. Additional information regarding the one page report and regarding the grading of the report will be provided at a later date.

Each paper must meet the following requirements:

1. The papers are to be on the history of mathematics. They can be neither all history nor all mathematics. Each should contain a reasonably non-trivial piece of mathematics as well as the history and background of that mathematics.
2. Enough expository material should be included so as to make the paper self-contained.
3. You should use a variety of research materials and must give careful references to your sources. You will want to use textbooks, other books, original sources, journals, web sites, and encyclopedias. Your paper should include a bibliography listing your sources and they should be cited in the body of your paper when appropriate.

4. The paper must be prepared using a word processor (you may write in symbols if the word processor you are using does not handle them). Other issues such as the length, format, etc., are up to you. You are telling a story which needs certain background, exposition, and detail. When that is successfully done, stop; you have finished. You should turn in two copies of your paper as I intend to keep one copy.

**Books on Reserve in our library for Math 52-843-01, Seminar: History of Mathematics:**

In the library reference room there are two excellent reference sets regarding individual mathematicians: *Dictionary of Scientific Biography* (18 volume set) and just a few volumes of logs and integrals down the shelf *Biographical Dictionary of Mathematicians* (a four volume subset of the Scientific Biography dealing with mathematicians only).

**Journals in our library known to contain articles relevant to the history of mathematics:**
*Historia Mathematica*, *Mathematical Intelligencer*
*Isis*, *The Mathematical Monthly*
*Mathematics Magazine*, *The College Mathematics Journal*
*The Mathematics Teacher*, *The Mathematics Gazette*