MA 484 History of Mathematical Thought

Fall Semester 2007 M-W-F 9:00-9:50 NSF 1209

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Office Hours: M and W 1:00 - 3:00; F 12:30 – 1:30; other times by appointment.

Required Texts and Materials:

- Burton, David M. *The History of Mathematics: An Introduction.* Sixth Edition. New York: McGraw Hill, 2007.
- Singh, Simon. *Fermat's Enigma*. New York: Anchor Books, 1997.

Course Overview:

***Mathematics is the alphabet with which God has written the universe.* (Galileo)**

Mathematics is an important human creation. It was not handed down from a mountain top. It was not discovered in polished form or in the form we know it today. Most mathematics developed out of a need to solve problems and out of curiosity about quantitative or spatial relationships. Mathematics develops through intuition, experimentation, curiosity, and creativity. Mathematics is a living body of knowledge; it is not now nor will it ever be "finished."

This course examines the historical underpinnings of mathematical ideas and the cross-cultural contributions of thinkers who helped shape mathematics. It also explores the close relationship of mathematics to other disciplines, such as astronomy and physics, as well as the ways in which mathematics both depends upon and contributes to historical, cultural, and technological realities of a particular time. The course strives to highlight both the utility and the beauty of the human creation that is mathematics.

In this course students are expected to be active contributors to, not just recipients of, the course content. Assignments will require you to read and do outside research as well as to solve problems and develop arguments and proofs. Class sessions will include small and large group discussions as well as formal presentations, and students will be expected to share the results of their investigations with the class.

Course Requirements:

- Attend all classes and participate actively in class discussions and activities. (Attendance will be taken daily and will constitute part of the course grade.)
- There will be several types of assignments, some involving outside reading and research, some involving mathematical problem solving, and some involving class presentations. Assignments will be described in class. You are expected to complete assignments on time. Written assignments are to be done with a word processor and submitted in hard copy.
- Complete all assigned readings and/or problems prior to the designated class period. Come to class prepared to raise as well as answer questions and otherwise contribute to discussion of the material. You can expect to be called upon in class to report on, present, or explain ideas from your assignments.
- There will be a mid-term and a final exam. The final exam is scheduled for Thursday, December 13, 8:00-9:50 a.m. Other test dates will be announced in class.

Course Objectives:

- To deepen your knowledge and appreciation for the historical roots and "humanness" of mathematics;
- To trace the roots and development of the major "strands" of mathematics as they evolved and intertwined through the centuries leading to the mathematics we know and use today;
- To illustrate how mathematics spans all cultures;
- To stimulate your interest to continue reading and studying the history and culture of mathematics after the course is over.

Course Content:

- From where does our mathematics originate? How do we get our knowledge of early mathematics?
- Development of the major branches of mathematics: arithmetic, number theory, algebra, geometry, analysis, probability, modern mathematics, etc.
- Examination of representative breakthroughs in mathematical thought.
- Solving selected problems that challenged mathematicians in the past.
- Mathematics—still alive and flourishing. A case study of mathematics as a human activity: Pythagoras to Pierre de Fermat to Andrew Wiles.

Grading:

Points will be assigned for class participation, projects, presentations, assignments, and tests. Your grade will be determined by the percentage of the total possible points that you earn, as follows:

A=93-100%; A–=90-92%; B+=87-89%; B=83-86%; B–=80-82%; etc.

You are expected to communicate in correct and proper English. Therefore, such things as grammar, spelling, punctuation, and syntax will be considered in the evaluation of your written work. Late assignments will have points deducted unless prior arrangements have been made.

Overview of Assignments

For the most part, there will be four kinds of assignments in this course:

- Reading assignments from the course text provide information about individual mathematicians, societies and cultures, historical contexts, and more. You are responsible for the content contained in the assigned readings.
- Find-out-about assignments for which you will be expected to do outside reading and research on a particular topic to learn what you can and to share that knowledge with the class. (For example, find out about the "birth" of zero and its development in different numeration systems.) Find-out-about assignments include a written summary of what you learned as well as in-class discussion and presentations. For these assignments you should consult at least four different sources; sources can include both books/journals and Internet sites, but no more than half of your references should be on-line sources. Your written reports are to include a bibliography of the resources you consulted, including author's name, title of the book or paper, publication information (for print resources) or URL (for Web resources).
- Do-math assignments which will involve solving mathematical problems of historical interest. These solutions or proofs will be written up and handed in. You do not need to type mathematics problems, but you do need to write clearly and organize your solutions well.
- Projects, which include papers and formal class presentations on topics related to the history of mathematics. Details will be given in class.

If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office by: coming into the office at 2001 C. B. Hedgcock; calling 227-1700; or e-mailing disserv@nmu.edu. Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.