MA 484 History of Mathematical Thought

Fall Semester 2004 M-W-F 9:00-9:50 WS 3616

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Office Hours: M, W, F 10:00 - 10:45 by prior appointment
M, W, R, F 2:00 - 3:30
Other times by appointment.

Required Texts and Materials:

- Dunham, William. *Journey through Genius: The Great Theorems of Mathematics*. New York: Penguin Books, 1991.
- Singh, Simon. *Fermat's Enigma*. New York: Anchor Books, 1997.
- Frequently during this course you will need to solve problems the require geometric constructions. Therefore, you should gather the items listed below and bring them to class with you: straightedge (ruler), compass, protractor. Scrap paper and an eraser are also useful items to have handy.
- It goes without saying that you should always have a calculator available.

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.

The format of this course is primarily that of a seminar. That is, 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.)
- There will be several types of assignments, some involving outside reading and research, some involving mathematical problem solving, and some involving class presentations. There also will be a major research paper and in-class report. Assignments will be described in class. You are expected to complete assignments on time. Writing assignments are to be done with a word processor.
- Complete all assigned readings 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.
- There will be two tests during the semester and a final exam at the end. The final exam is scheduled for Tuesday, December 14, 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.

If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office at 2001 C. B. Hedgcock (227-1700; TTY 227-1543). 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.