MATH 405/505
History of Mathematics

Course Designation
MAT 405/505. HISTORY OF MATHEMATICS. Historical analysis of mathematics as a field of knowledge. Prerequisite: MAT 251. 3

The historical development from the beginnings of writing and numeration to the Hindu-Arabic base ten system commonly used today as a continual progression driven by the need to express amounts with greater precision whether larger or smaller amounts. The numeration development culminates with base two and computer systems. After numeration the students will be exposed to the Greek development of geometry and number theory as described by Euclid and Eratosthenes along with others. The systematic and general solutions for problems that give rise to the modern subject of algebra is outlined from the earliest stages provided in the Rhind Papyrus along with Babylonian solutions to quadratic equations to the general solution of the cubic equation developed with Cardan and Tartaglia, which gives rise to the need for the imaginary unit. The scientific view of the universe as thought by Ptolemy is explained in juxtaposition with that of Aristarchus of Samos, and how Ptolemy's view remained the dominate view of the universe till the work of Galileo, Copernicus, Kepler, and Newton changed the universe. Lastly, the basics of modern mathematics will be developed using set theory and some of the findings of mathematicians such as Georg Cantor.

Conceptual Framework: "The purposes of the Department of Mathematics are to prepare teachers of mathematics for the elementary and secondary schools, to provide a foundation for professional careers in mathematics, and to provide for the mathematical needs of the general student," (*2005-2006 Delta State Bulletin*). This view of education supports the College of Education's Conceptual Framework Delta Model which is based on Performance, Professionalism, and Preparation of candidates to become the educators that are needed not only in the delta, but also throughout the state and nation.

> The Conceptual Framework can be found at:
> http://www.deltastate.edu/docs/math/ConceptualFramework.pdf

General Course Goals
As presently designed, the course is a survey of the development of significant mathematical ideas and a historical analysis of mathematics as a field of knowledge from the dawn of history (pre-Egypt, pre-Mesopotamia) to the 21st century. Since the time frame of a one-semester course forces selection, all periods and ideas cannot be covered in depth. An overview of many topics will be presented with an emphasis on a few of these. The instructor will select the topics for emphasis. The text will be supplemented by selected outside readings and activities. Some suggestions for the readings will be provided but will not be limited to these; student input will be expected.

Text

Burton, David M. The History of Mathematics: An Introduction (8th Ed.). New York, New York: McGraw Hill, 2010.

Dunham, William. Journey through Genius: The Great Theorems of Mathematics. New York, New York: Penguin Books, 1990.

General Course Objectives
Upon completion of the course, the student will be able:

1.   To explain the origins of the mathematics in everyday usage.
2.   To explain historical development in mathematics that includes the contributions of many cultures including under represented groups and diverse cultures.
3.   To discuss basic biographical information concerning outstanding mathematicians.
4.   To explain and demonstrate older methods for performing mathematical computations.
5.   To compare and contrast the mathematical methods of the past including the development of classic algorithms for calculating with present day methods.
6.   To discuss the major mathematical trends in the various centuries.
7.   To explain the relationship between the value systems of the various cultures and the mathematical discoveries made by these cultures.
8.   To select, as a prospective teacher of mathematics, enrichment materials suitable for use in teaching.
9.   To compute with various types of numeration systems and bases other than base 10, and cite examples of cultures using each.
10.   To explain the development of measurement throughout the ages and apply various systems of measurement to two- and three-dimensional objects.
11.   To explain basic number theory ideas such as perfect number, amicable numbers, prime numbers, and figurative numbers.
12.   To discuss the development of the various branches of mathematics including, but not limited to algebra, geometry, trigonometry, probability, and calculus.
13.   To compare present-day philosophies of mathematics.

Technology will be used as a tool for presentations to you and as part of assignments. Students will be asked to use different software packages to complete assignments. This will include both Sketchpad and Excel.

This course will discuss the mathematics and science of different cultures at different points in time. It is hoped that the student will develop an understanding and appreciation of these different groups and their contributions to the current level of mathematical and scientific knowledge.

Presentation Methods
1.   Lecture- 60%
2.   Class discussions/demonstrations/activities- 30%

3.   Presentation of readings and projects - 10%

Major Student Activities
1.   Attend all classes.
2.   Read, summarize, and discuss text assignments and other outside readings.
3.   Prepare and present assigned projects.
4.   Participate in class discussions and activities.
5.   Prepare and demonstrate assigned homework exercises from the textbook which reinforce subject matter content.
7.   Complete midterm and final examinations.

Evaluation and Grading
Midterm – 30%
Final – 30%
Written assignments, homework, demonstrations at the board, discussions, participation, and projects – 30%
Article Summary - 10%

Assignments for MA 505 will include topics not required for MA 405. Essay topics for MA 505 will be assigned separately and will require a greater depth of research and critique.

Semester grades will be determined on the following scale:
90-100 A; 80-89 B; 70-79 C; 60-69 D; below 60 F.

Class Attendance
Prompt and regular attendance is necessary for success in this course. Any student that exceeds two weeks worth of classes without verifiable excuses will receive a lowered final grade by one letter. A student is allowed a maximum of 3 weeks worth of classes. Any person exceeding this number will receive a semester grade of "F." Please be on time for each class meeting. If your class schedule is such that prompt and regular attendance cannot be accomplished, please arrange to take this course during a later semester.

Cheating:
Cheating and plagiarism will not be tolerated in this course. Students will be held to the highest standards of conduct, which means students will not use other students nor individuals, in any fashion or form of communication, for information beyond common knowledge in this course. You will adhere to the spirit of becoming an educated individual with self reliance and resolve being your guide. Students shall foster the ability to find, value, and analyse information for themselves. The first infraction of this policy will result in a zero on the assignment, and a second may result in being dismissed from the class.

Delta State University is committed to a policy of equal employment and educational opportunity. Delta State University does not discriminate on the basis of race, color, religion, national origin, sex, age, disability, or veteran status. This policy extends to all programs and activities supported by the University.

If a student has a disability that qualifies under the American with Disabilities Act and requires accommodation, he should contact the Academic Support Lab (Union 311; phone 846-4654) for information on Appropriate policies and procedures.

Cellular telephones and devises may be used in class without penalty as long as the telephone or devise is kept in plain sight at all times. The exception to this rule is testing in which not such device may be used unless the instructions tell you so to do.

GENERAL COURSE INFORMATION
Mathematics Department
Caylor White Walters 209A, Phone 662-846-4508
Dr. David Jay Hebert
dhebert@deltastate.edu
Office Hours are posted on my office door. Additional time may be arranged by appointment.
09.00-10.00 Monday, Wednesday, and Friday
09.00-10.30; 13.30-15.30 Tuesday and Thursday
Other times by appointment.

Disabilities Statement and Policy:

It is the responsibility of students who have professionally diagnosed disabilities to notify the instructor so that necessary and/or appropriate modifications can be made to meet any special learning needs. Students are also directed to contact the Disability Director for the University who will coordinate the accommodations process.

Important Dates:

Final Exam Schedule