**MAT 5401 - An Introduction to the History of Mathematics**

*Prerequisites*: MAT 301 or instructor's consent

This class is a development of areas of mathematics such as algebra, geometry, and analysis and a study of the lives and works of outstanding mathematicians.

## Rationale

This course will help mathematics students gain an understanding of the nature of mathematics and the relationships within it by viewing it historically. The courses emphasize the historical development of mathematics from the perspective of many mathematicians/philosophers from many cultures.

## Professor

Dr. Teresa Floyd - 925-3468 Office: 316 MCC e-mail: floyd@mc.edu
Office hours: TBA.

## Learning Objectives

At the conclusion of the course, successful students should be able to:
-demonstrate methods of counting and number systems used by ancient civilizations
-state methods of recording information that provided modern knowledge of ancient mathematics
-find triangular, square and pentagonal numbers
-calculate amicable, perfect, prime, abundant and deficient numbers
-name the Platonic solids
-state the three classic problems of antiquity with a proposed solution
-state Euclid=s accomplishments
-name several Greek mathematicians, their major accomplishments, and solve problems similar to their work
-name the accomplishments of and work problems relating to early Chinese, Hindu and Arabic mathematicians
-list reasons why there was minimal mathematical progress during the Dark Ages
-name prominent mathematicians of the 17th century, identify their work and work similar problems
-name the major mathematicians whose work prepared the world for calculus and work similar problems
-name the creators of calculus and identify how their work was different
-name prominent mathematicians of the 18th century; identify their work and work similar problems
-name prominent mathematicians of the 19th century; identify their work and work similar problems
-name prominent mathematicians of the 20th century; identify their work and work similar problems

## Outline of Topics

The topics will come from the material in Chapters 1-13 of the text. Students are expected to read all assigned sections and attempt solutions to problems assigned relating to these topics.

I. Early Number Systems and Symbols
  A. Sources
  B. Properties

II. Mathematics in Early Civilizations
  A. Egyptian Mathematics
    1. Arithmetic
    2. Geometry
  B. Babylonian Mathematics

III. The Beginnings of Greek Mathematics
  A. Thales
  B. Pythagorean Mathematics

VII. The Renaissance of Mathematics
  A. Europe in $14^{th}$ & $15^{th}$ Century
  B. Cardano=s *Ars Magna*
  C. Ferrari

VIII. The Mechanical World
  A. Galileo
  B. Copernicus
  C. Kepler
  D. Descartes
  E. Newton=s *Principia*
  F. Leibniz

C. Three Problems of Antiquity
D. Quadratrix

IV. The Alexandrian School: Euclid
A. Euclid=s *Elements*
B. Euclidean Geometry
C. Euclid=s Number Theory
D. Erathosthenes
E. Archimedes

V. The Twilight of Greek Mathematics
A. Diophantus= *Arithmetica*
B. Diophantine Equations
C. Commentators
D. Mathematics in Near & Far East

VI.. The First Awakening
A. Fibonacci
B. *Liber Abaci*
C. Fibonacci Sequence

IX. The Development of Probability Theory
A. The Origins of Probability
B. Pascal
C. Bernoullis & Laplace

X. The Revival of Number Theory
A. Mersenne=s Search for Perfect Numbers
B. From Fermat to Euler
C. Gauss

XI. Nineteenth-Century
A. Attempts to Prove the Parallel Postulate
B. Non-Euclidean Geometry
C. The Age of Rigor

XII. Transition to the Twentieth Century
A. American Mathematics
B. Counting the Infinite
C. Paradoxes of Set Theory

XIII. Extensions and Generalizations

**Academic Integrity**

Honesty and integrity are basic virtues expected of all students at Mississippi College. *The Mississippi College Undergraduate Catalog* lists the policies and penalties for plagiarism and cheating. See the *Mississippi College Student Handbook* for specific information regarding penalties. On tests, quizzes, and individual out-of-class projects, the work is assumed to be the student's own and **no cheating will be tolerated**.

**Methods of Instruction**

The methods of instruction will include lecture, discussion, student reports, group problem solving, individual problem solving, demonstrations, hands-on construction, exploration using graphing calculators/software, and quizzes. Each student is expected to be prepared for class, have a copy of the text, paper, pencils, calculator, and compass.

**Required Practices**

Required practices for successful completion of this course include reading assigned materials *on time*, timely written completion of problems, oral and written reports using internet sources as well as traditional ones, proficient use of calculators, classroom explanation of solved problems, and completion of written examinations. Homework problems are due **at the beginning** of the class for which they were assigned. **A written report of a book about one mathematician is required and must include a brief oral presentation to the class about the mathematician. Since this class meets with an undergraduate section, there will be a separate graduate assignment of homework problems on some days. Many days the graduate problem assignment will be the same as the undergraduate problem assignment. Often the test for graduate students will contain different problems.**

**Instructional Materials**

Text: Burton, D. B. (2010). *The History of Mathematics* (7th Ed.). Boston, MA: WCB McGraw Hill. ISBN: 978-0-073-38315-6.

**Assessment**

Assessment will include tests (100 points each), oral and written reports (10-20 points), in-class explanations/demonstrations of problems, and unannounced homework evaluations (5-10 points each). Active

class participation (25 points) is expected, affected by class attendance, and included in final grade evaluation. **Final examination is _____.** The final grade will be determined based on total points and a ten-point scale. LAST DAY TO DROP IS _____. LAST DAY TO DROP WITH REFUNDS IS _____.

**Other Policies**

- **Attendance**: You are expected to be in class **on time and prepared**! The college stipulates that the grade for the course is an F in the event of 12 or more absences in a MWF class. Tardiness to class will result in a 0 for the daily grade if a quiz was missed or homework was collected unless the student provides an acceptable reason for class disruption. **If a student is tardy, they must see Dr. Floyd immediately after class with a reason to change the recorded absence to tardy.**
- **Final day to add** the class is _____.
- **Final day to drop** the class is _____.
- **Make-up work:** This is the responsibility of the student and should be cleared with Dr. Floyd *in advance* when possible (i.e.: athletes, student activities, etc.). **Students are responsible for all material covered and all assignments given when they are absent.** (You should have homework completed whether or not you attended the previous class meeting.) Make-up work will only be allowed for approved absences. It must be completed within one week of returning to class unless otherwise scheduled.
- **Special Accommodation**: In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services **immediately upon recognition of their disability**(if their disability is known they must come in before the semester begins or make an appointment **immediately** upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (**within 3 years).**The student must meet with SCS **face-to face** and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in **each semester** to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan).

  Student Counseling Services is located in Alumni Hall Room #4 or they may be contacted via email at rward@mc.edu. You may also reach them by phone at **601-925-7790.**