BROWARD COLLEGE
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Course Outline

Course Title: History Of Mathematics
Common Course Title: MHF4404
Effective Term: Fall 2018 (Aug 20, 2018)
Credit Hours: 3 Units

Next Review : Aug 1, 2023
Contact Hour Breakdown: *(Per 16 week Term)*

Total: 48	
Lecture:	Lab:
Clinic:	Other:

Requirements

Pre/Co-requisite(s) with minimum grade required
MAC2311 (C) *AND* MAD2104 (C)

Course Description:

MHF4404 is a chronological study of the evolution of mathematical thought from primitive counting to modern ideas. The study will include the development of mathematics through history, the impact of mathematics on society, and how mathematics has broadened our knowledge of the world. Throughout the course students will be shown and encouraged to discover connections between historical and modern mathematics. The course is designed for math students who want to understand the development of mathematics, teachers of mathematics at all levels, and students who have an interest in social and cultural history.

Course Outline

UNITS

Unit 1 : Babylonian and Egyptian Mathematics

General Outcome
1.0 Demonstrate a basic understanding of the role of the Babylonians and Egyptians in the development of mathematics.

Specific Learning Outcomes
1.1 Convert and perform operations with ancient Babylonian and Egyptian numerals.
1.2 Describe Babylonian methods for solving systems of the form $x + y = a$ and $xy = b$.
1.3 Describe and perform Egyptian mathematics from the Rhind Papyrus and Moscow Papyrus, such as: Egyptian numerals, Egyptian Multiplication, and Egyptian Fractions.
1.4 Explain Babylonian methods for solving quadratic equations.
1.5 Summarize additional topics selected by the instructor.

Unit 2 : Greek Mathematics

General Outcome
2.0 Demonstrate a basic understanding of the role of the Greeks in the development of mathematics.

Specific Learning Outcomes
2.1 Describe Pythagorean mathematics, the proof and use of the Pythagorean theorem.
2.2 Analyze the three famous problems of classical Greek times: Squaring the Circle, Doubling the Cube, and Trisecting an Angle.
2.3 Perform geometric constructions with a compass and straight edge and/or computer software.

2.4 Construct and explain proofs from Euclid's Elements, including the Pythagorean Theorem.
2.5 Explain the Greek contributions to prime numbers, such as Euclid's proof of the infinitude of primes and the Sieve of Eratosthenes.
2.6 Research and present the mathematical contributions of Archimedes and other famous Greek mathematicians.

Unit 3 : Chinese, Indian, and Arabian Mathematics

General Outcome
3.0 Demonstrate a basic understanding of the role of the Chinese, Indian, and Arabian cultures to the development of mathematics.

Specific Learning Outcomes
3.1 Evaluate methods found in the ancient Chinese text; The Nine Chapters on the Mathematical Art.
3.2 Compare and contrast Indian Trigonometry methods with those of the Greeks.
3.3 Describe the development and use of the Hindu-Arabic place-value system.
3.4 Explain the use of and solve problems using the Chinese Remainder Theorem.
3.5 Research and present the mathematical contributions of Liu Hui, Brahmagupta, Al-Khwarizmi, and other famous Chinese, Indian, and Arabian mathematicians.

Unit 4 : Early European Mathematics

General Outcome
4.0 Demonstrate a basic understanding of the role of the Early Europeans to the development of mathematics.

Specific Learning Outcomes
4.1 Critique geometry and trigonometry used in medieval Europe.
4.2 Describe the development and use of logarithms.
4.3 Describe how the development of perspective changed the world of art.
4.4 Describe how geometry and astronomy was used in navigation during this time.
4.5 Explain the development of elementary probability.
4.6 Describe the use of Pascal's triangle.
4.7 Research and present the mathematical contributions of Fibonacci, Napier, Pascal, and other famous mathematics from medieval Europe and the early Renaissance in Europe covering the span between the 5th century and the 16th century.

Unit 5 : Analytic Geometry and the Beginnings of Calculus

General Outcome
5.0 Demonstrate a basic understanding of the process of the development of Calculus.

Specific Learning Outcomes
5.1 Describe the goals of early calculus to mathematically describe physical motion and to find areas bounded by curves.
5.2 Explain the fundamental theorem of Calculus.
5.3 Research and present 17th century Calculus leading to development of modern Calculus.
5.4 Compare the contributions to Calculus and approaches of Isaac Newton to that of Gottfried Leibniz..
5.5 Research and present the mathematical contributions of Descartes, Newton, Leibniz, and other famous mathematicians who contributed to Analytic Geometry and the Beginnings of Calculus.

Unit 6 : Eighteenth and Early Nineteenth Century Mathematics

General Outcome
6.0 Demonstrate a basic understanding of the developments in mathematics during the Eighteenth and early Nineteenth

Centuries.

Specific Learning Outcomes
6.1 Discuss the rise of logic and games as presented by Lewis Carroll.
6.2 Describe the development and use of the metric system.
6.3 Explore the role of conjecture and paradox.
6.4 Make the connection between differential equations and applications.
6.5 Research and present the contributions of Euler, Gauss, and other famous Eighteenth and Early Nineteenth century mathematicians.

Unit 7 : Later Nineteenth and Twentieth Century Mathematics

General Outcome
7.0 Demonstrate a basic understanding of the development in mathematics during the late Nineteenth and the Twentieth Centuries.

Specific Learning Outcomes
7.1 Describe the connections between physics and mathematics as discovered by Einstein.
7.2 Illustrate the use of the binary and hexadecimal number systems and how they relate to computers.
7.3 Discuss the possibility of proving a theorem using a computer.
7.4 Explain the difference between Euclidean and non-Euclidean geometries.
7.5 **Research and present** the mathematical contributions of Riemann, Hilbert, and other famous Later Nineteenth and Twentieth century mathematicians.

Unit 8 : Mathematics from around the world

General Outcome
8.0 Demonstrate a basic understanding of the unique mathematical systems found in cultures not previously discussed.

Specific Learning Outcomes
8.1 Describe contributions of the indigenous peoples of the Americas including the Mayans.
8.2 Discuss the contributions of African cultures.
8.3 Explain developments in mathematics made by the Pacific Island cultures.