MATH (UG) - Mathematics

Global Citizenship Program Knowledge Areas **(....)**	
ARTS	Arts Appreciation
GLBL	Global Understanding
PNW	Physical & Natural World
QL	Quantitative Literacy
ROC	Roots of Cultures
SSHB	Social Systems & Human Behavior

Global Citizenship Program Skill Areas (....)	
CRI	Critical Thinking
ETH	Ethical Reasoning
INTC	Intercultural Competence
OCOM	Oral Communication
WCOM	Written Communication
** Course fulfills two skill areas	

MATH 1010 Fundamentals of Mathematics (3)

Develops and strengthens the concepts and skills of elementary mathematics, particularly skills related to various disciplines of the college curriculum. For credit only.

MATH 1050 Basic Algebra (3)

Introduces the basic topics of algebra, including linear and quadratic equations.

MATH 1100 Math Tutoring (1)

This course identifies basic tutoring techniques that encourage a child to think about, verbalize and solve problems. It will also identify some common K-5 math problem areas, provide video examples of good tutoring techniques and materials, and address classroom etiquette. Successful completion of this course is a requirement for participation in the Webster Math Tutoring Program. **Prerequisite:** Approval of the instructor.

MATH 1200 Topics in Mathematics (3)

For students interested in applications of elementary mathematics to everyday life. May be repeated for credit if content differs.

MATH 1360 Business Mathematics (3)

This course provides the student with a variety of opportunities to strengthen math skills necessary for analyzing numerical information and solving practical business problems. Students will learn to translate business-related problems into simple equations. Topics include applications of ratio and proportion, computing taxes, commercial discounts, simple and compound interest, basic statistics, and graphs. **GCP Coding: (QL).**

MATH 1370 Business Applications of Algebra (3)

This course will emphasize the use of basic algebra concepts in solving numerical problems common in business and management. Students will apply skills of writing, solving and graphing elementary equations. Students will apply basic linear programming methods to management science problems.

MATH 1410 Introductory College Mathematics (3)

Covers various topics of mathematics that are both conceptual and practical. Course is designed to enable a student to appreciate mathematics and its application to numerous disciplines and professions. **GCP Coding: (QL).**

MATH 1420 Modular Algebra (3)

This course explores algebra through the lens of the modular systems, each a finite and unique world generated by remainders. Students will develop number sense, problem-solving skills and a deeper understanding of arithmetic and algebra as they experience the beauty, underlying structure, surprising results and creative potential of mathematics.

MATH 1430 College Algebra (3)

Covers sets, the real number system, functions, equations, inequalities and logarithms. **GCP Coding: (QL).**

MATH 1440 Trigonometry (3)

Presents trigonometric functions using the unit circle. **Prerequisite**: MATH 1430 or equivalent competence.

MATH 1470 Survey of Calculus (3)

Introduces the ideas of calculus without the rigor associated with the course in the standard calculus sequence. It can be used by students who are not mathematics or science majors to understand the concepts of calculus well enough to apply them to their own discipline. It might also be used as a stepping stone to get a head start before taking the standard calculus course. The emphasis is on computational ability, problem solving and applications. **Prerequisite**: Proficiency in algebra.

MATH 1480 Precalculus (3)

This course covers topics including factoring, simplifying rational functions, functions and their graphs, solving linear and nonlinear equations, polynomial functions, inverse functions, the binomial theorem, logarithms, exponentials, solutions to systems of equations using matrices, solutions to nonlinear systems of equations, sequences and limits. Student will also study trigonometric and inverse trigonometric functions with emphasis on trigonometric identities and equations.

MATH 1490 Finite Mathematics (3)

Studies set terminology and operations, subsets, the power set, Cartesian products, and finite cardinality, relations as sets of ordered pairs, characteristic functions, digraphs, functions as relations, types of functions and relations. **Prerequisite**: MATH 1430.

MATH 1580 Formal Logic (3)

Covers all the fundamental topics in deductive logic. A thorough introduction to propositional and predicate logic. Cross-listed with COSC 1580 and PHIL 2020.

MATH 1610 Calculus I (5)

Introduces differential and integral calculus of a single variable. Topics include limits, derivatives, integrals and applications. Introduces calculus of transcendental functions. Only offered in a 16-week format. May be repeated once for credit. **Prerequisite**:

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High school trigonometry, precalculus, or MATH 1480 with a grade of B or better. **GCP Coding**: **(QL).**

MATH 1620 Calculus II (5)

Continues the study of calculus of a single variable. Topics include techniques of integration, parametric equations, polar coordinates, sequences and series, and applications. Only offered in a 16-week format. **Prerequisite**: MATH 1610.

MATH 2200 Statistics (3)

Statistics is the science of analyzing data and arriving at reasonable and intelligent conclusions based upon that analysis. This course will acquaint students with the mathematical concepts of statistical analysis. **Prerequisite**: Sophomore standing. **GCP Coding**: **(QL).**

MATH 2410 Discrete Mathematics (3)

Discrete math deals with finite numbers and finite processes. This course uses the algorithmic approach to problem solving. Topics may include set, relations, and functions; graphs and trees; counting techniques; and recurrence relations. **Prerequisite**: COSC 1550.

MATH 2450 Introduction to Abstract Mathematics (3)

This course serves as a transition course from calculus to abstract mathematics. The emphasis is on understanding and writing mathematical proofs. Topics include logic, set theory, relations, functions and elementary number theory. **Prerequisite**: MATH 1620.

MATH 3000 Calculus III (5)

Includes differential and integral calculus of several variables. Only offered in a 16-week format. **Prerequisite**: MATH 1620.

MATH 3020 Numerical Analysis (3)

Numerical methods are used to analyze a variety of problems. Emphasis is on understanding why these methods work and their limitations. **Prerequisite**: MATH 3000.

MATH 3030 Theory of Equations (3)

This course is an introduction to the study of algebraic equations that goes beyond what is generally covered in a standard college algebra class. **Prerequisite**: MATH 1610.

MATH 3040 Differential Equations (3)

Studies techniques for solving ordinary differential equations; examines existence and uniqueness of solutions; considers a variety of applications. **Prerequisite**: MATH 3000.

MATH 3050 History of Mathematics (3)

This course is a survey of the history of mathematics. Topics include the history of numbers, numeration systems, arithmetic, algebra, geometry, calculus and modern geometry. **Prerequisite**: MATH 1610.

MATH 3070 Calculus IV (3)

This course studies calculus with more rigor and depth than in the usual calculus sequence. **Prerequisites**: MATH 2450 and MATH 3000.

MATH 3090 Advanced Topics (3)

Includes a variety of advanced topics offered under different subtitles. May be repeated for credit if content differs. **Prerequisites**: Vary with subtitle.

MATH 3130 Real Number System (3)

Presents the real number system as a complete ordered field. Topics include rational and irrational, algebraic and transcendental numbers, sequences and their limits, and continuous functions of real numbers. **Prerequisite**: MATH 2450.

MATH 3160 Linear Algebra (3)

Linear algebra is concerned with vectors, matrices, and systems of linear equations and with functions called linear transformations. Linear algebra is one of the most important tools of applied mathematics. Some of the disciplines using linear algebra are economics, physics, biology, statistics, computer graphics, engineering, business, ecology, sociology, demography and genetics. **Prerequisite**: Junior standing.

MATH 3210 Data Mining Foundations (3)

This course explores the core concepts of data mining including the research methodology and process, data sources, messy data and data cleansing. It also examines algorithms in each of the main data mining groupings of classification, categorization and association rules. The course emphasizes the use of data mining concepts in real-world applications with database components. Students will present their findings and recommendations in written and oral project reports. **Prerequisite**: Junior standing.

MATH 3220 Data Mining Methods (3)

This course surveys the current techniques of problem solving using modern heuristics. It covers classic methods of optimization, including dynamic programming, the simplex method and gradient techniques, as well as recent innovations such as simulated annealing, tabu search and evolutionary computation. Besides exploring a compendium of specific techniques, this course also delves into the approaches of framing and attacking the issue of problem solving itself. Students will present their findings and recommendations in written and oral project reports. **Prerequisite**: Junior standing.

MATH 3300 Introduction to Number Theory (3)

Studies elementary properties of integers, primes, congruencies and arithmetic functions. **Prerequisite**: MATH 3000.

MATH 3500 Introduction to Algebraic Structures (3)

Presents concrete material designed to make the transition from college algebra to modern abstract algebra; includes an introduction to groups. **Prerequisite**: MATH 2450.

MATH 3510 Vector Geometry (3)

This course studies geometry using vectors. **Prerequisite**: MATH 1620.

MATH 3530 Modern Geometry (3)

Provides a review of Euclidean geometry and an introduction of non-Euclidean geometries; general axiomatic systems are considered. **Prerequisite**: MATH 2450.

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MATH 3610 Probability (3)

Focuses on those mathematical models that have been developed to best deal with the phenomena of chance and random behavior. **Prerequisite**: MATH 1620.

MATH 4010 Abstract Algebra (3)

Presents an axiomatic study of groups, rings and fields. **Prerequisites**: MATH 2450 and MATH 3000.

MATH 4110 Introduction to Analysis (3)

Provides a theoretical look at the concepts presented in elementary calculus. Topics include basic topology of the real number line, series of functions, theory of integers, etc. **Prerequisites**: MATH 2450 and MATH 3000.

MATH 4500 Applications of Mathematics (3)

Includes applications of advanced mathematics selected at the instructor's discretion. May be repeated for credit if content differs. **Prerequisite**: MATH 3000.

Course Descriptions