MATH - Mathematics

GCP Coding (QL)

** Course fulfills two skill areas

| ARTS | Arts Appreciation |
| GLBL | Global Understanding |
| PNW  | Physical & Natural World |
| QL   | Quantitative Literacy |
| ROC  | Roots of Cultures |
| SSHB | Social Systems & Human Behavior |

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 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 1210 Calculus I (5)
Introduces differential and integral calculus of one variable, culminating in the fundamental theorem of calculus. Introduces calculus of transcendental functions. May be repeated once for credit. Prerequisite: High school trigonometry or MATH 1440 with grade of B or better. Only offered in a 16-week format. GCP Coding: (QL)

MATH 1220 Calculus II (5)
Continues the study of calculus: the transcendental functions, techniques of integration, applications of the integral, polar coordinates, parametric equations, sequences, and series. Prerequisite: MATH 1610. Only offered in a 16-week format.

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)
Introduces trigonometric functions using the unit circle. Prerequisite: MATH 1430 or equivalent competence.

MATH 1450 Calculus I Lab (1)
Supplementary experiences with applications and technology designed to augment the understanding of Calculus I. May be repeated once for credit. Prerequisite: Taken concurrently with MATH 1610.

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 1580 Formal Logic (3)
Covers all the fundamental topics in deductive logic. A thorough introduction to propositional and predicate logic.

MATH 1600 Calculus I Lab (1)
Supplementary experiences with applications and technology designed to augment the understanding of Calculus I. May be repeated once for credit. Prerequisite: Taken concurrently with MATH 1610.

MATH 1610 Calculus I (5)
Introduces differential and integral calculus of one variable, culminating in the fundamental theorem of calculus. Introduces calculus of transcendental functions. May be repeated once for credit. Prerequisite: High school trigonometry or MATH 1440 with grade of B or better. Only offered in a 16-week format. GCP Coding: (QL)

MATH 1620 Calculus II (5)
Continues the study of calculus: the transcendental functions, techniques of integration, applications of the integral, polar coordinates, parametric equations, sequences, and series. Prerequisite: MATH 1610. Only offered in a 16-week format.
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MATH 1630 Calculus II Lab (1)
Supplementary experience with applications and technology, designed to augment the understanding of Calculus II. 
Prerequisite: Taken concurrently with MATH 1620.

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 2500 Calculus III Lab (1)
Supplementary experiences with applications and technology, designed to augment the understanding of Calculus III. Prerequisite: Taken concurrently with MATH 3000.

MATH 3000 Calculus III (5)
Includes differential and integral calculus of several variables. Prerequisite: MATH 1620. Only offered in a 16-week format.

MATH 3010 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 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 3060 Calculus IV (3)
This course studies calculus with more rigor and depth than in the usual calculus sequence. Prerequisite: MATH 3000.

MATH 3070 Calculus IV (3)
Includes a variety of advanced topics offered under different subtitles. Prerequisites vary with subtitle. May be repeated for credit if content differs.

MATH 3080 Real Number System (3)
This course studies the natural numbers, integers, rational numbers, and real numbers, with a focus on the classification of real numbers as either rational or irrational and as algebraic or transcendental. Also covered are the field properties, order properties, and completeness properties of the real number system. Prerequisite: MATH 1620.

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 3200 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 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. Prerequisite: MATH 1620.

MATH 3510 Vector Geometry (3)
This course studies geometry using vectors. Prerequisite: MATH 1620.

MATH 3530 Modern Geometry (3)
Geometry is studied using post-Euclidean methods. Prerequisite: MATH 1620.

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.
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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. **Prerequisite:** MATH 3000. May be repeated for credit if content differs.