

Mathematics (MATH)

College of Natural Science and Mathematics

Department of Mathematics and Statistics (<https://www.uaf.edu/dms/>)
907-474-7332

Community and Technical College

Department of Developmental Education
907-455-2842

Mathematics Department Courses

MATH F113X Numbers and Society (m)

3 Credits

Offered Fall, Spring and Summer

Numbers and patterns are present in every aspect of daily life. We use mathematical concepts and tools to understand what numbers and patterns can tell us. Topics may include the mathematics of voting; dividing things fairly; determining efficient routes and schedules; modeling population growth; understanding financial mathematics; and introductory cryptography.

Prerequisites: An appropriate score on the math placement test, or a grade of B or better in MATH F055, MATH F062 or MATH F068.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F122X Essential Precalculus with Applications (m)

3 Credits

Offered Fall and Spring

A study of various classes of functions, exploring their numeric, algebraic and graphical aspects. Function classes include linear, quadratic, rational, exponential and logarithmic. This course is appropriate for students in programs relating to business and economics or life sciences or students intending to take MATH F230X.

Prerequisites: Appropriate placement score, MATH F105, MATH F105N or MATH F105J.

Special Notes: Credit may be earned for MATH F151X or MATH F122X, but not for both.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F151X College Algebra for Calculus (m)

4 Credits

Offered Fall and Spring

Study of algebraic, logarithmic and exponential functions; systems of equations; applications.

Prerequisites: Appropriate score on the math placement test, B or better in MATH F105, B or better in MATH F105J or C or better in MATH F105N.

Special Notes: Credit may be earned for MATH F151X or MATH F122X, but not for both; Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4.5 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F152X Trigonometry (m)

3 Credits

Offered Fall and Spring

A study of trigonometric functions including graphing, identities, inverse trigonometric functions, solving equations and polar coordinates; applications.

Prerequisites: MATH F151X (may be taken concurrently) or placement.

Special Notes: Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F156X Precalculus (m)

4 Credits

Offered Fall and Spring

Various classes of functions and their graphs are explored numerically, algebraically and graphically. Function classes include polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus are emphasized. This class is intended for students intending to take MATH F251X.

Prerequisites: Placement into MATH F156X.

Special Notes: Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F186 Applied Engineering Mathematics

4 Credits

Offered Fall

Fundamental mathematics topics appearing in first- and second-year engineering classes. All content is taught within the context of an engineering application. Specific topics include applications of algebra, trigonometry, vectors, sinusoids, linear systems, complex numbers, derivatives and integrals.

Prerequisites: Appropriate score on the math placement test and high school trigonometry; or MATH F151X and MATH F152X; or MATH F156X.

Cross-listed with ES F186.

Lecture + Lab + Other: 4 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F211 Mathematics for Elementary School Teachers (m)

3 Credits

Offered Fall

Elementary set theory, numeration systems, and algorithms of arithmetic, divisors, multiples, integers and introduction to rational numbers. Emphasis on classroom methods. Restricted to Elementary Education majors; others by permission of instructor.

Prerequisites: MATH F122X; or MATH F151X; or MATH F156X; or placement.

Lecture + Lab + Other: 3 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F212 Mathematics for Elementary School Teachers II (m)

3 Credits

Offered Spring

A continuation of MATH F211. Real number systems and subsystems, logic, informal geometry, metric system, probability and statistics. Emphasis on classroom methods.

Prerequisites: MATH F211.

Lecture + Lab + Other: 3 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F230X Essential Calculus with Applications in the Life Sciences

3 Credits

Offered Fall and Spring

An introduction to the key ideas of differential and integral calculus, emphasizing applications in the life sciences. This course emphasizes a solid conceptual understanding, along with calculation techniques for basic applications. MATH F230X cannot serve as a prerequisite for MATH F252X.

Prerequisites: MATH F122X or MATH F151X or MATH F156X or appropriate score on the math placement test.

Special Notes: Credit cannot be earned for both MATH F230X and MATH F251X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F251L Calculus I Recitation

0 Credit

Offered Fall and Spring

Recitation section for Calculus I. Activities may include worksheets, quizzes and problem sessions associated with corresponding lecture material from MATH F251X, with an emphasis on prerequisite support.

Corequisites: MATH F251X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 0 + 2 + 0

Grading System: Non-Graded

MATH F251X Calculus I (m)

4 Credits

Offered Fall and Spring

A first course in single-variable calculus. Topics include limits; continuity and differentiation of functions; applications of the derivative to graphing, optimization, and rates of change; definite and indefinite integration; and the Fundamental Theorem of Calculus.

Prerequisites: Appropriate score on the math placement test; or MATH F151X and MATH F152X; or MATH F156X; or ES/MATH F186.

Corequisites: MATH F251L.

Special Notes: Credit may not be earned for both MATH F251X and MATH F230X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F252X Calculus II (m)

4 Credits

Offered Fall and Spring

Further topics in single-variable calculus, including techniques of integration; applications of integration; convergence of sequences and series; parameterized curves; and polar coordinates.

Prerequisites: MATH F251X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F253X Calculus III (m)

4 Credits

Offered Fall and Spring

Multivariable calculus. Topics include vectors in 2- and 3-dimensions; differential calculus of functions of several variables; multiple integration; vector calculus, including Green's and Stokes' Theorem; and applications.

Prerequisites: MATH F252X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F265 Introduction to Mathematical Proofs (m)

3 Credits

Offered Spring

Emphasis on proof techniques with topics including logic, sets, cardinality, relations, functions, equivalence, induction, number theory, congruence classes and elementary counting. In addition, a rigorous treatment of topics from calculus or a selection of additional topics from discrete mathematics may be included.

Prerequisites: MATH F252X (may be taken concurrently).

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F302 Differential Equations

3 Credits

Offered Fall and Spring

Nature and origin of differential equations, first order equations and solutions, linear differential equations with constant coefficients, systems of equations, power series solutions, operational methods, and applications.

Prerequisites: MATH F253X.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F305 Geometry

3 Credits

Offered Spring Even-numbered Years

Topics selected from such fields as Euclidean and non-Euclidean plane geometry, affine geometry, projective geometry, and topology.

Prerequisites: MATH F265; MATH F314.

Recommended: MATH F253X.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F307 Discrete Mathematics

3 Credits

Offered Spring

Logic, counting, sets and functions, recurrence relations, graphs and trees. Additional topics chosen from probability theory.

Prerequisites: MATH F252X.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F314 Linear Algebra

3 Credits

Offered Fall and Spring

Linear equations, finite dimensional vector spaces, matrices, determinants, linear transformations and characteristic values. Inner product spaces.

Prerequisites: MATH F252X.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F316 Introduction to the History of Mathematics

3 Credits

Offered Spring Odd-numbered Years

Important periods in the history of mathematics, including mathematics of Ancient Babylon, Mesopotamia, Greece, China and India, medieval Europe, the Middle East and the Renaissance; the development of geometry, algebra and calculus. Other areas in the development of mathematics will be studied as time permits.

Prerequisites: MATH F253X; MATH F265 (may be taken concurrently).

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F320 Topics in Combinatorics

3 Credits

Offered Fall Odd-numbered Years

Introduction to some fundamental ideas of combinatorics. Topics selected from such fields as enumerative combinatorics, generating functions, set systems, recurrence relations, directed graphs, matchings, Hamiltonian and Eulerian graphs, trees and graph colorings.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F321 Number Theory**

3 Credits

Offered Fall Even-numbered Years

Number theory investigates the properties of the integers, one of the most basic of mathematical sets. Seemingly naive number-theoretic questions stimulated much of the development of modern mathematics! Topics may include classical areas such as primality, congruences, quadratic reciprocity and Diophantine equations, and more recent applications, such as cryptography.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F371 Probability**

3 Credits

Offered Fall Odd-numbered Years

Probability spaces, conditional probability, random variables, continuous and discrete distributions, expectation, moments, moment generating functions and characteristic functions.

Prerequisites: MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F401 Introduction to Real Analysis**

3 Credits

Offered Fall

Completeness of the real numbers and its consequence, convergence of sequences and series, limits and continuity, differentiation, the Riemann integral.

Prerequisites: WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X; MATH F253X; MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F404 Introduction to Topology**

3 Credits

Offered Fall Even-numbered Years

Introduction to topological spaces, set theory, open sets, compactness, connectedness, product spaces, metric spaces and continua.

Prerequisites: MATH F253X; MATH F265.**Recommended:** MATH F314 and/or MATH F405.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F405 Abstract Algebra**

3 Credits

Offered Spring

Theory of groups, rings and fields.

Prerequisites: WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X; MATH F265.**Recommended:** MATH F307 and/or MATH F314.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F408 Mathematical Statistics**

3 Credits

Offered Spring Even-numbered Years

Distribution of random variables and functions of random variables, interval estimation, point estimation, sufficient statistics, order statistics, and test of hypotheses including various criteria for tests.

Prerequisites: MATH F371; STAT F200X or STAT F300.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F410 Introduction to Complex Analysis**

3 Credits

Offered Fall Odd-numbered Years

Complex functions including series, integrals, residues, conformal mapping and applications.

Prerequisites: MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F412 Differential Geometry**

3 Credits

Offered Spring Odd-numbered Years

Introduction to the differential geometry of curves, surfaces, and Riemannian manifolds. Basic concepts covered include the Frenet-Serret apparatus, surfaces, first and second fundamental forms, geodesics, Gauss curvature and the Gauss-Bonnet Theorem. Time permitting, topics such as minimal surfaces, theory of hypersurfaces and/or tensor analysis may be included.

Prerequisites: MATH F314; MATH F401.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F426 Numerical Analysis**

3 Credits

Offered Fall

Direct and iterative solutions of systems of equations, interpolation, numerical differentiation and integration, numerical solutions of ordinary differential equations, and error analysis.

Prerequisites: MATH F302 or MATH F314.**Recommended:** Knowledge of programming.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F430 Topics in Mathematics**

3 Credits

Offered Fall Even-numbered Years

An elective course in mathematics for majors. Topics will vary from year to year and may be drawn from mathematical biology, numerical linear algebra, graph theory, logic, or other areas of mathematics. May be repeated with permission of instructor for a total of nine credits.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**Repeatable for Credit:** May be taken 3 times for up to 9 credits**MATH F432 Introduction to Partial Differential Equations**

3 Credits

Offered Spring Odd-numbered Years

Analysis and solution of partial differential equations. Initial and boundary value problems for parabolic, hyperbolic and elliptic types. Solution methods include separation of variables and Fourier transform.

Prerequisites: MATH F302.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus

MATH F460 Mathematical Modeling

3 Credits

Offered Spring Even-numbered Years

Introduction to mathematical modeling using differential or difference equations. Emphasis is on formulating models and interpreting qualitative behavior such models predict. Examples will be taken from a variety of fields, depending on the interest of the instructor. Students develop a modeling project.

Prerequisites: COM F131X or COM F141X; MATH F252X; WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X.

Recommended: one or more of MATH F302, MATH F314, MATH F401, MATH F426, STAT F300 or some programming experience.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F490 Senior Seminar

3 Credits

Offered Spring

Advanced topics selected from areas outside the usual undergraduate offerings. A substantial level of mathematical maturity is assumed.

Prerequisites: COM F131X or COM F141X; at least one of MATH F401 or MATH F405; senior standing.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F600 Teaching Seminar

1 Credit

Offered Fall

Fundamentals of teaching mathematics in a university setting. Topics may include any aspect of teaching: university regulations, class and lecture organization, testing, book selection, teaching evaluations, etc. Specific topics will vary on the basis of student and instructor interest. Individual classroom visits will also be used for class discussion.

Prerequisites: Graduate standing.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken 2 times for up to 2 credits

MATH F614 Numerical Linear Algebra

3 Credits

Offered Fall Odd-numbered Years

Algorithms and theory for stable and accurate computation using matrices and vectors on computers. Matrix factorizations, direct and iterative methods for solving linear systems, least squares, eigenvalue and singular value decompositions. Practical implementation and application of algorithms.

Prerequisites: MATH F314.

Recommended: MATH F401 or MATH F432.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F615 Numerical Analysis of Differential Equations

3 Credits

Offered Spring Odd-numbered Years

Review of numerical differentiation and integration, and the numerical solution of ordinary differential equations. Main topics to include the numerical solution of partial differential equations, curve fitting, splines, and the approximation of functions. Supplementary topics such as the numerical method of lines, the fast Fourier transform, and finite elements may be included as time permits and interest warrants.

Prerequisites: CS F201; MATH F314; MATH F410; MATH F426; MATH F432.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F617 Functional Analysis

3 Credits

Offered Spring Even-numbered Years

Study of Banach and Hilbert spaces, and continuous linear maps between them. Linear functionals and the Hahn-Banach theorem. Applications of the Baire Category theorem. Compact operators, self adjoint operators, and their spectral properties. Weak topology and its applications.

Prerequisites: MATH F314; MATH F401.

Recommended: MATH F410; MATH F641.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F631 Algebra I

4 Credits

Offered Fall Even-numbered Years

Rigorous development of groups, rings and fields.

Prerequisites: MATH F405.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F632 Algebra II

3 Credits

Offered Spring Odd-numbered Years

Advanced topics which may be chosen from group theory, Galois theory, commutative or non-commutative algebra, algebraic geometry, homological algebra or other areas.

Prerequisites: MATH F631.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F641 Real Analysis

4 Credits

Offered Fall Odd-numbered Years

General theory of Lebesgue measure and Lebesgue integration on the real line. Convergence properties of the integral. Introduction to the general theory of measures and integration. Differentiation, the product measures and an introduction to LP spaces.

Prerequisites: MATH F401.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F645 Complex Analysis

4 Credits

Offered Spring Even-numbered Years

Analytic functions, power series, Cauchy integral theory, residue theorem. Basic topology of the complex plane and the structure theory of analytic functions. The Riemann mapping theorem. Infinite products.

Prerequisites: MATH F641.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F651 Topology

4 Credits

Offered Spring Odd-numbered Years

Treatment of the fundamental topics of point-set topology. Separation axioms, product and quotient spaces, convergence via nets and filters, compactness and compactifications, paracompactness, metrization theorems, countability properties, and connectedness. Set theory as needed for examples and proof techniques.

Prerequisites: MATH F401 or MATH F404.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F658 Topics in Geometry

3 Credits

Offered Fall Even-numbered Years

Elective topics in geometry. Recent offerings include configurations of points and lines; topology and differential geometry of surfaces; polyhedra and polytopes.

Prerequisites: Linear algebra; geometry; undergraduate real analysis; undergraduate abstract algebra.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Repeatable for Credit: May be taken 2 times for up to 6 credits

MATH F660 Advanced Mathematical Modeling

3 Credits

Offered Spring Even-numbered Years

The mathematical formulation and analysis of problems arising in the physical, biological, or social sciences. The focus area of the course may vary, but emphasis will be given to modeling assumptions, derivation of model equations, methods of analysis, and interpretation of results for the particular applications. Examples include heat conduction problems, random walk processes, molecular evolution, perturbation theory. Students will develop a modeling project as part of the course requirements.

Prerequisites: Permission of instructor.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F661 Optimization

3 Credits

Offered Fall Even-numbered Years

Linear and nonlinear programming, simplex method, duality and dual simplex method, post-optimal analysis, constrained and unconstrained nonlinear programming, Kuhn-Tucker conditions. Applications to management, physical and life sciences. Computational work with the computer.

Prerequisites: Knowledge of calculus, linear algebra and computer programming.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F663 Graph Theory

3 Credits

Offered Fall Odd-numbered Years

A survey of modern techniques in graph theory; topics may include graphs and digraphs, trees, spanning trees, matchings, graph connectivity, graph coloring, planarity, cycles, and extremal problems.

Prerequisites: MATH F314; MATH F320.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F665 Topics in Graduate Mathematics

3 Credits

Offered As Demand Warrants

Elective courses in graduate mathematics offered by faculty on a rotating basis. Topics may include, but are not limited to, graph theory, glaciology modeling, general relativity, mathematical biology, Galois theory and numerical linear algebra. May be repeated for credit with permission of instructor.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Repeatable for Credit: May be taken 3 times for up to 9 credits

MATH F692 Seminar

1-6 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F698 Non-thesis Research/Project

1-6 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F699 Thesis

1-9 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

Developmental Education Department Courses**MATH F051 Math Skills Review**

1 Credit

Offered As Demand Warrants

Develops and reviews basic mathematical terminology, theory and operations as outlined by the Alaska State Mathematics Standards. Mathematics topics focus on reviewing the six basic "strands" of mathematical content: numeration, measurement, estimation/computation, function/relationship, geometry, and statistics/probability. Approaches to problem solving will emphasize the process of mathematical thinking, communication and reasoning. May be repeated for a total of three credits.

Special Notes: It is an appropriate course for those preparing for the High School Qualifying Exam in Alaska or those needing a review of basic math skills in preparation for a math placement test at UAF.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 3 credits

MATH F053 SAT/ACT Math Prep and Review

1 Credit

Offered As Demand Warrants

This course will review basic concepts and practice math test taking skills to help prepare for the ACT and SAT tests.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

MATH F054 Prealgebra

3 Credits

Offered As Demand Warrants

Basic concepts of prealgebra mathematics. Topics include operations and applications of whole numbers, integers, fractions, decimals, ratios and proportions, percents, geometry and measures, evaluation of algebraic expressions and applications.

Prerequisites: DEVS F111 (may be taken concurrently); and appropriate placement scores.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054A Modularized Mastery Math: Prealgebra Module A

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Appropriate placement test score within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054B Modularized Mastery Math: Prealgebra Module B

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F054A; or appropriate placement test scores taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054C Modularized Mastery Math: Prealgebra Module C

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting. Prerequisite courses and/or placement exams must be taken within one calendar year.

Prerequisites: Grade of B or better in MATH F054B; or appropriate placement test scores; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055 Elementary Algebra

3 Credits

Offered As Demand Warrants

Topics include evaluation and simplifying algebraic expressions, polynomials, factoring, integer exponents, rational expressions, solutions of linear equations and inequalities, graphing lines, solving systems of linear equations, solving quadratic equations by factoring, and some rational equations. Prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Prerequisites: DEVS F111 (may be taken concurrently); and grade of C or better in MATH F054 or ABUS F155, or appropriate placement scores.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055D Modularized Mastery Math: Elementary Algebra Module D

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: simplifying algebraic expressions, solving linear equations in one variable, solving linear and compound inequalities in one variable, applications of linear equations and solving formulas. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F054, or ABUS F155; or appropriate placement test scores; permission of instructor required; prerequisite courses and/or placement exams must be taken within one calendar year.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055E Modularized Mastery Math: Elementary Algebra Module E

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: linear equations in two variables, graphing linear equations, find the slope of linear equations, writing equations of lines, exponent rules and operations on polynomials. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055D taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055F Modularized Mastery Math: Elementary Algebra Module F

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: factoring polynomials, solving quadratic equations by factoring, simplifying rational expressions, operations with rational expressions, complex fractions, solving rational equations and applications of quadratic and rational equations. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055E taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F056 Math Fast Track: Prealgebra/Elementary Algebra Review

1 Credit

Offered As Demand Warrants

A 20-hour intensive review of math concepts available prior to each semester. Covers prealgebra and elementary algebra topics to prepare qualified students to potentially improve their math course placement. Students who are successful in this class have the possibility of advancing through one or two semesters of development math.

Prerequisites: Placement into MATH F054 or MATH F055.

Special Notes: Students should have a history of being successful in equivalent levels of math, although they may not recall enough information to place well on the placement test.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F061 Review of Elementary Algebra

1 Credit

Offered As Demand Warrants

Designed to assist students in reviewing material covered by MATH F055. Individuals who have not previously taken an elementary algebra course are recommended to enroll in MATH F055. Available via UAF eCampus only.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F062 Alternative Approaches to Math: Elementary Algebra

3 Credits

Offered As Demand Warrants

Algebraic topics. Includes operations with polynomial expressions, first- and second-degree equations, graphing, integral and relational exponents, and radicals using alternative teaching styles.

Prerequisites: Grade of C- or better in MATH F054; or ABUS F155; or appropriate placement test scores; prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F065 Mathematics Skills

1-3 Credits

Offered As Demand Warrants

Designed to assist students in reviewing and reinforcing course concepts covered by MATH F054, MATH F055, MATH F062, MATH F105 and MATH F105N. Consists of instruction which may include lab instruction, individual student work or group work. May be repeated.

Special Notes: Recommended for students who need more time and help to master the material in developmental math courses.

Lecture + Lab + Other: 1-3 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken 99 times for up to 99 credits

MATH F066 Advanced Math Fast Track: Elementary/Intermediate Algebra Review

1 Credit

Offered As Demand Warrants

A 20-hour intensive review of math concepts available prior to each semester. Covers elementary and intermediate algebra topics to prepare qualified students to potentially improve their math course placement. Students should have a history of being successful in equivalent levels of math, although they may not recall enough information to place well on the placement test. Students who are successful in this class have the possibility of advancing through one or two semesters of development math.

Prerequisites: Placement into MATH F055 or MATH F105 or MATH F105N.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F068 Math Essentials

4 Credits

Offered As Demand Warrants

Arithmetic and introductory algebra. Solve problems related to operations and properties of real numbers; proportion; percent; evaluation of algebraic expressions; solution and graphs of linear equations and inequalities; solving systems of linear equations; exponent rules; operations on polynomials; factoring; fundamental operations with rational expressions; solutions and applications of quadratic equations.

Prerequisites: DEVS F111 (may be taken concurrently); and a grade of C or better in MATH 054 or appropriate placement scores; prerequisite course and/or placement exams must be taken within one calendar year prior to commencement of the course.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F071 Review of Intermediate Algebra

1 Credit

Offered As Demand Warrants

Course reviews material covered by MATH F105. Individuals who have not taken an intermediate algebra course on the high-school level are recommended to enroll in MATH F105. Available via UAF eCampus only.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F105 Intermediate Algebra

3 Credits

Offered As Demand Warrants

Topics include expressions, equations and applications involving linear, absolute value, radical, quadratic, rational and radical functions; graphs of absolute value, radical, quadratic, exponential and logarithmic functions; functions and their inverses; and introduction to exponential and logarithmic functions.

Prerequisites: Grade of C or better in MATH F055, MATH F062 or MATH F068, or appropriate placement test scores; prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Special Notes: To matriculate to MATH F151X from MATH F105, students must earn a grade of B or higher.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F105G Modularized Mastery Math: Intermediate Algebra Module G

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F105 Intermediate Algebra course and includes the following topics: solving systems of equations and applications, simplifying radicals and expressions with rational exponents, performing operations on radical expressions, solving radical equations and performing operations on complex numbers. Topics are split into mini-modules and worked until mastery is achieved. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055 or MATH F069 or appropriate placement test scores; permission of instructor required; prerequisite courses and/or placement exams must be taken.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F105H Modularized Mastery Math: Intermediate Algebra Module H

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F105 Intermediate Algebra course and includes the following topics: review of solving quadratic equations by factoring, solving quadratic equations that are not factorable, relations and functions, graphs and transformations of functions, quadratic functions and their graphs, performing operations on functions, compositions of functions and applications of quadratic equations and functions. Topics are split into mini-modules and worked until mastery is achieved. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F105G taken within one calendar year; permission of instructor is required.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F105J Modularized Mastery Math: Intermediate Algebra Module J

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH Intermediate Algebra course and includes the following topics: solving absolute value equations and inequalities, solving linear and compound linear inequalities, solving quadratic and rational inequalities, inverse functions, exponential and logarithmic functions, properties of logarithms and solving exponential and logarithmic equations. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F105H taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F105N Intensive Intermediate Algebra

4 Credits

Offered As Demand Warrants

Includes exponents, radicals, graphing, quadratic equations and inequalities, logarithms, exponentials and complex numbers using alternative teaching styles.

Prerequisites: MATH F055, MATH F055F, MATH F062, MATH F068, MATH F105 or MATH F105J, or appropriate placement scores; prerequisite courses and placement scores must be taken within one calendar year.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Mathematics

MATH F051 Math Skills Review

1 Credit

Offered As Demand Warrants

Develops and reviews basic mathematical terminology, theory and operations as outlined by the Alaska State Mathematics Standards. Mathematics topics focus on reviewing the six basic "strands" of mathematical content: numeration, measurement, estimation/computation, function/relationship, geometry, and statistics/probability. Approaches to problem solving will emphasize the process of mathematical thinking, communication and reasoning. May be repeated for a total of three credits.

Special Notes: It is an appropriate course for those preparing for the High School Qualifying Exam in Alaska or those needing a review of basic math skills in preparation for a math placement test at UAF.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 3 credits

MATH F053 SAT/ACT Math Prep and Review

1 Credit

Offered As Demand Warrants

This course will review basic concepts and practice math test taking skills to help prepare for the ACT and SAT tests.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

MATH F054 Prealgebra

3 Credits

Offered As Demand Warrants

Basic concepts of prealgebra mathematics. Topics include operations and applications of whole numbers, integers, fractions, decimals, ratios and proportions, percents, geometry and measures, evaluation of algebraic expressions and applications.

Prerequisites: DEVS F111 (may be taken concurrently); and appropriate placement scores.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054A Modularized Mastery Math: Prealgebra Module A

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Appropriate placement test score within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054B Modularized Mastery Math: Prealgebra Module B

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F054A; or appropriate placement test scores taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F054C Modularized Mastery Math: Prealgebra Module C

1 Credit

Offered As Demand Warrants

This course covers one credit of MATH F054 Prealgebra and includes the following topics: identifying and solving basic linear equations involving whole numbers, integers, decimals and fractions, solving ratio and proportion problems, solving percent problems, and solving applied problems. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting. Prerequisite courses and/or placement exams must be taken within one calendar year.

Prerequisites: Grade of B or better in MATH F054B; or appropriate placement test scores; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055 Elementary Algebra

3 Credits

Offered As Demand Warrants

Topics include evaluation and simplifying algebraic expressions, polynomials, factoring, integer exponents, rational expressions, solutions of linear equations and inequalities, graphing lines, solving systems of linear equations, solving quadratic equations by factoring, and some rational equations. Prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Prerequisites: DEVS F111 (may be taken concurrently); and grade of C or better in MATH F054 or ABUS F155, or appropriate placement scores.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055D Modularized Mastery Math: Elementary Algebra Module D

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: simplifying algebraic expressions, solving linear equations in one variable, solving linear and compound inequalities in one variable, applications of linear equations and solving formulas. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F054, or ABUS F155; or appropriate placement test scores; permission of instructor required; prerequisite courses and/or placement exams must be taken within one calendar year.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055E Modularized Mastery Math: Elementary Algebra Module E

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: linear equations in two variables, graphing linear equations, find the slope of linear equations, writing equations of lines, exponent rules and operations on polynomials. Some mini-modules may be skipped if a student already demonstrates mastery of them.

Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055D taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F055F Modularized Mastery Math: Elementary Algebra Module F

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F055 Elementary Algebra course and includes the following topics: factoring polynomials, solving quadratic equations by factoring, simplifying rational expressions, operations with rational expressions, complex fractions, solving rational equations and applications of quadratic and rational equations. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055E taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F056 Math Fast Track: Prealgebra/Elementary Algebra Review

1 Credit

Offered As Demand Warrants

A 20-hour intensive review of math concepts available prior to each semester. Covers prealgebra and elementary algebra topics to prepare qualified students to potentially improve their math course placement. Students who are successful in this class have the possibility of advancing through one or two semesters of development math.

Prerequisites: Placement into MATH F054 or MATH F055.

Special Notes: Students should have a history of being successful in equivalent levels of math, although they may not recall enough information to place well on the placement test.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F061 Review of Elementary Algebra

1 Credit

Offered As Demand Warrants

Designed to assist students in reviewing material covered by MATH F055. Individuals who have not previously taken an elementary algebra course are recommended to enroll in MATH F055. Available via UAF eCampus only.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F062 Alternative Approaches to Math: Elementary Algebra

3 Credits

Offered As Demand Warrants

Algebraic topics. Includes operations with polynomial expressions, first- and second-degree equations, graphing, integral and relational exponents, and radicals using alternative teaching styles.

Prerequisites: Grade of C- or better in MATH F054; or ABUS F155; or appropriate placement test scores; prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F065 Mathematics Skills

1-3 Credits

Offered As Demand Warrants

Designed to assist students in reviewing and reinforcing course concepts covered by MATH F054, MATH F055, MATH F062, MATH F105 and MATH F105N. Consists of instruction which may include lab instruction, individual student work or group work. May be repeated.

Special Notes: Recommended for students who need more time and help to master the material in developmental math courses.

Lecture + Lab + Other: 1-3 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken 99 times for up to 99 credits

MATH F066 Advanced Math Fast Track: Elementary/Intermediate Algebra Review

1 Credit

Offered As Demand Warrants

A 20-hour intensive review of math concepts available prior to each semester. Covers elementary and intermediate algebra topics to prepare qualified students to potentially improve their math course placement.

Students should have a history of being successful in equivalent levels of math, although they may not recall enough information to place well on the placement test. Students who are successful in this class have the possibility of advancing through one or two semesters of development math.

Prerequisites: Placement into MATH F055 or MATH F105 or MATH F105N.

Lecture + Lab + Other: 1 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F068 Math Essentials

4 Credits

Offered As Demand Warrants

Arithmetic and introductory algebra. Solve problems related to operations and properties of real numbers; proportion; percent; evaluation of algebraic expressions; solution and graphs of linear equations and inequalities; solving systems of linear equations; exponent rules; operations on polynomials; factoring; fundamental operations with rational expressions; solutions and applications of quadratic equations.

Prerequisites: DEVS F111 (may be taken concurrently); and a grade of C or better in MATH 054 or appropriate placement scores; prerequisite course and/or placement exams must be taken within one calendar year prior to commencement of the course.

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F071 Review of Intermediate Algebra

1 Credit

Offered As Demand Warrants

Course reviews material covered by MATH F105. Individuals who have not taken an intermediate algebra course on the high-school level are recommended to enroll in MATH F105. Available via UAF eCampus only.

Lecture + Lab + Other: 1 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F105 Intermediate Algebra**

3 Credits

Offered As Demand Warrants

Topics include expressions, equations and applications involving linear, absolute value, radical, quadratic, rational and radical functions; graphs of absolute value, radical, quadratic, exponential and logarithmic functions; functions and their inverses; and introduction to exponential and logarithmic functions.

Prerequisites: Grade of C or better in MATH F055, MATH F062 or MATH F068, or appropriate placement test scores; prerequisite courses and/or placement exams must be taken within one calendar year prior to commencement of the course.

Special Notes: To matriculate to MATH F151X from MATH F105, students must earn a grade of B or higher.

Lecture + Lab + Other: 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F105G Modularized Mastery Math: Intermediate Algebra Module G**

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F105 Intermediate Algebra course and includes the following topics: solving systems of equations and applications, simplifying radicals and expressions with rational exponents, performing operations on radical expressions, solving radical equations and performing operations on complex numbers. Topics are split into mini-modules and worked until mastery is achieved. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F055 or MATH F069 or appropriate placement test scores; permission of instructor required; prerequisite courses and/or placement exams must be taken.

Lecture + Lab + Other: 1 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F105H Modularized Mastery Math: Intermediate Algebra Module H**

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH F105 Intermediate Algebra course and includes the following topics: review of solving quadratic equations by factoring, solving quadratic equations that are not factorable, relations and functions, graphs and transformations of functions, quadratic functions and their graphs, performing operations on functions, compositions of functions and applications of quadratic equations and functions. Topics are split into mini-modules and worked until mastery is achieved. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F105G taken within one calendar year; permission of instructor is required.

Lecture + Lab + Other: 1 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F105J Modularized Mastery Math: Intermediate Algebra Module J**

1 Credit

Offered As Demand Warrants

This course covers one credit of the MATH Intermediate Algebra course and includes the following topics: solving absolute value equations and inequalities, solving linear and compound linear inequalities, solving quadratic and rational inequalities, inverse functions, exponential and logarithmic functions, properties of logarithms and solving exponential and logarithmic equations. Some mini-modules may be skipped if a student already demonstrates mastery of them. Computers will be used within a structured and independent learning setting.

Prerequisites: Grade of B or better in MATH F105H taken within one calendar year; permission of instructor required.

Special Notes: Topics are split into mini-modules and worked until mastery is achieved.

Lecture + Lab + Other: 1 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F105N Intensive Intermediate Algebra**

4 Credits

Offered As Demand Warrants

Includes exponents, radicals, graphing, quadratic equations and inequalities, logarithms, exponentials and complex numbers using alternative teaching styles.

Prerequisites: MATH F055, MATH F055F, MATH F062, MATH F068, MATH F105 or MATH F105J, or appropriate placement scores; prerequisite courses and placement scores must be taken within one calendar year.

Lecture + Lab + Other: 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F113X Numbers and Society (m)**

3 Credits

Offered Fall, Spring and Summer

Numbers and patterns are present in every aspect of daily life. We use mathematical concepts and tools to understand what numbers and patterns can tell us. Topics may include the mathematics of voting; dividing things fairly; determining efficient routes and schedules; modeling population growth; understanding financial mathematics; and introductory cryptography.

Prerequisites: An appropriate score on the math placement test, or a grade of B or better in MATH F055, MATH F062 or MATH F068.

Attributes: UAF GER Mathematics Req**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F122X Essential Precalculus with Applications (m)**

3 Credits

Offered Fall and Spring

A study of various classes of functions, exploring their numeric, algebraic and graphical aspects. Function classes include linear, quadratic, rational, exponential and logarithmic. This course is appropriate for students in programs relating to business and economics or life sciences or students intending to take MATH F230X.

Prerequisites: Appropriate placement score, MATH F105, MATH F105N or MATH F105J.

Special Notes: Credit may be earned for MATH F151X or MATH F122X, but not for both.

Attributes: UAF GER Mathematics Req**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus

MATH F151X College Algebra for Calculus (m)

4 Credits

Offered Fall and Spring

Study of algebraic, logarithmic and exponential functions; systems of equations; applications.

Prerequisites: Appropriate score on the math placement test, B or better in MATH F105, B or better in MATH F105J or C or better in MATH F105N.

Special Notes: Credit may be earned for MATH F151X or MATH F122X, but not for both; Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4.5 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F152X Trigonometry (m)

3 Credits

Offered Fall and Spring

A study of trigonometric functions including graphing, identities, inverse trigonometric functions, solving equations and polar coordinates; applications.

Prerequisites: MATH F151X (may be taken concurrently) or placement.

Special Notes: Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F156X Precalculus (m)

4 Credits

Offered Fall and Spring

Various classes of functions and their graphs are explored numerically, algebraically and graphically. Function classes include polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus are emphasized. This class is intended for students intending to take MATH F251X.

Prerequisites: Placement into MATH F156X.

Special Notes: Only eight credits total may be earned from MATH F151X, MATH F152X and MATH F156X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F186 Applied Engineering Mathematics

4 Credits

Offered Fall

Fundamental mathematics topics appearing in first- and second-year engineering classes. All content is taught within the context of an engineering application. Specific topics include applications of algebra, trigonometry, vectors, sinusoids, linear systems, complex numbers, derivatives and integrals.

Prerequisites: Appropriate score on the math placement test and high school trigonometry; or MATH F151X and MATH F152X; or MATH F156X.

Cross-listed with ES F186.

Lecture + Lab + Other: 4 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F211 Mathematics for Elementary School Teachers (m)

3 Credits

Offered Fall

Elementary set theory, numeration systems, and algorithms of arithmetic, divisors, multiples, integers and introduction to rational numbers. Emphasis on classroom methods. Restricted to Elementary Education majors; others by permission of instructor.

Prerequisites: MATH F122X; or MATH F151X; or MATH F156X; or placement.

Lecture + Lab + Other: 3 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F212 Mathematics for Elementary School Teachers II (m)

3 Credits

Offered Spring

A continuation of MATH F211. Real number systems and subsystems, logic, informal geometry, metric system, probability and statistics. Emphasis on classroom methods.

Prerequisites: MATH F211.

Lecture + Lab + Other: 3 + 1 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F230X Essential Calculus with Applications in the Life Sciences

3 Credits

Offered Fall and Spring

An introduction to the key ideas of differential and integral calculus, emphasizing applications in the life sciences. This course emphasizes a solid conceptual understanding, along with calculation techniques for basic applications. MATH F230X cannot serve as a prerequisite for MATH F252X.

Prerequisites: MATH F122X or MATH F151X or MATH F156X or appropriate score on the math placement test.

Special Notes: Credit cannot be earned for both MATH F230X and MATH F251X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F251L Calculus I Recitation

0 Credit

Offered Fall and Spring

Recitation section for Calculus I. Activities may include worksheets, quizzes and problem sessions associated with corresponding lecture material from MATH F251X, with an emphasis on prerequisite support.

Corequisites: MATH F251X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 0 + 2 + 0

Grading System: Non-Graded

MATH F251X Calculus I (m)

4 Credits

Offered Fall and Spring

A first course in single-variable calculus. Topics include limits; continuity and differentiation of functions; applications of the derivative to graphing, optimization, and rates of change; definite and indefinite integration; and the Fundamental Theorem of Calculus.

Prerequisites: Appropriate score on the math placement test; or MATH F151X and MATH F152X; or MATH F156X; or ES/MATH F186.

Corequisites: MATH F251L.

Special Notes: Credit may not be earned for both MATH F251X and MATH F230X.

Attributes: UAF GER Mathematics Req

Lecture + Lab + Other: 4 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F252X Calculus II (m)

4 Credits

Offered Fall and Spring

Further topics in single-variable calculus, including techniques of integration; applications of integration; convergence of sequences and series; parameterized curves; and polar coordinates.

Prerequisites: MATH F251X.**Attributes:** UAF GER Mathematics Req**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F253X Calculus III (m)**

4 Credits

Offered Fall and Spring

Multivariable calculus. Topics include vectors in 2- and 3-dimensions; differential calculus of functions of several variables; multiple integration; vector calculus, including Green's and Stokes' Theorem; and applications.

Prerequisites: MATH F252X.**Attributes:** UAF GER Mathematics Req**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F265 Introduction to Mathematical Proofs (m)**

3 Credits

Offered Spring

Emphasis on proof techniques with topics including logic, sets, cardinality, relations, functions, equivalence, induction, number theory, congruence classes and elementary counting. In addition, a rigorous treatment of topics from calculus or a selection of additional topics from discrete mathematics may be included.

Prerequisites: MATH F252X (may be taken concurrently).**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F302 Differential Equations**

3 Credits

Offered Fall and Spring

Nature and origin of differential equations, first order equations and solutions, linear differential equations with constant coefficients, systems of equations, power series solutions, operational methods, and applications.

Prerequisites: MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F305 Geometry**

3 Credits

Offered Spring Even-numbered Years

Topics selected from such fields as Euclidean and non-Euclidean plane geometry, affine geometry, projective geometry, and topology.

Prerequisites: MATH F265; MATH F314.**Recommended:** MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F307 Discrete Mathematics**

3 Credits

Offered Spring

Logic, counting, sets and functions, recurrence relations, graphs and trees. Additional topics chosen from probability theory.

Prerequisites: MATH F252X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F314 Linear Algebra**

3 Credits

Offered Fall and Spring

Linear equations, finite dimensional vector spaces, matrices, determinants, linear transformations and characteristic values. Inner product spaces.

Prerequisites: MATH F252X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F316 Introduction to the History of Mathematics**

3 Credits

Offered Spring Odd-numbered Years

Important periods in the history of mathematics, including mathematics of Ancient Babylon, Mesopotamia, Greece, China and India, medieval Europe, the Middle East and the Renaissance; the development of geometry, algebra and calculus. Other areas in the development of mathematics will be studied as time permits.

Prerequisites: MATH F253X; MATH F265 (may be taken concurrently).**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F320 Topics in Combinatorics**

3 Credits

Offered Fall Odd-numbered Years

Introduction to some fundamental ideas of combinatorics. Topics selected from such fields as enumerative combinatorics, generating functions, set systems, recurrence relations, directed graphs, matchings, Hamiltonian and Eulerian graphs, trees and graph colorings.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F321 Number Theory**

3 Credits

Offered Fall Even-numbered Years

Number theory investigates the properties of the integers, one of the most basic of mathematical sets. Seemingly naive number-theoretic questions stimulated much of the development of modern mathematics! Topics may include classical areas such as primality, congruences, quadratic reciprocity and Diophantine equations, and more recent applications, such as cryptography.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F371 Probability**

3 Credits

Offered Fall Odd-numbered Years

Probability spaces, conditional probability, random variables, continuous and discrete distributions, expectation, moments, moment generating functions and characteristic functions.

Prerequisites: MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F401 Introduction to Real Analysis**

3 Credits

Offered Fall

Completeness of the real numbers and its consequence, convergence of sequences and series, limits and continuity, differentiation, the Riemann integral.

Prerequisites: WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X; MATH F253X; MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus

MATH F404 Introduction to Topology

3 Credits

Offered Fall Even-numbered Years

Introduction to topological spaces, set theory, open sets, compactness, connectedness, product spaces, metric spaces and continua.

Prerequisites: MATH F253X; MATH F265.**Recommended:** MATH F314 and/or MATH F405.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F405 Abstract Algebra**

3 Credits

Offered Spring

Theory of groups, rings and fields.

Prerequisites: WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X; MATH F265.**Recommended:** MATH F307 and/or MATH F314.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F408 Mathematical Statistics**

3 Credits

Offered Spring Even-numbered Years

Distribution of random variables and functions of random variables, interval estimation, point estimation, sufficient statistics, order statistics, and test of hypotheses including various criteria for tests.

Prerequisites: MATH F371; STAT F200X or STAT F300.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F410 Introduction to Complex Analysis**

3 Credits

Offered Fall Odd-numbered Years

Complex functions including series, integrals, residues, conformal mapping and applications.

Prerequisites: MATH F253X.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F412 Differential Geometry**

3 Credits

Offered Spring Odd-numbered Years

Introduction to the differential geometry of curves, surfaces, and Riemannian manifolds. Basic concepts covered include the Frenet-Serret apparatus, surfaces, first and second fundamental forms, geodesics, Gauss curvature and the Gauss-Bonnet Theorem. Time permitting, topics such as minimal surfaces, theory of hypersurfaces and/or tensor analysis may be included.

Prerequisites: MATH F314; MATH F401.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F426 Numerical Analysis**

3 Credits

Offered Fall

Direct and iterative solutions of systems of equations, interpolation, numerical differentiation and integration, numerical solutions of ordinary differential equations, and error analysis.

Prerequisites: MATH F302 or MATH F314.**Recommended:** Knowledge of programming.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F430 Topics in Mathematics**

3 Credits

Offered Fall Even-numbered Years

An elective course in mathematics for majors. Topics will vary from year to year and may be drawn from mathematical biology, numerical linear algebra, graph theory, logic, or other areas of mathematics. May be repeated with permission of instructor for a total of nine credits.

Prerequisites: MATH F265.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**Repeatable for Credit:** May be taken 3 times for up to 9 credits**MATH F432 Introduction to Partial Differential Equations**

3 Credits

Offered Spring Odd-numbered Years

Analysis and solution of partial differential equations. Initial and boundary value problems for parabolic, hyperbolic and elliptic types. Solution methods include separation of variables and Fourier transform.

Prerequisites: MATH F302.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F460 Mathematical Modeling**

3 Credits

Offered Spring Even-numbered Years

Introduction to mathematical modeling using differential or difference equations. Emphasis is on formulating models and interpreting qualitative behavior such models predict. Examples will be taken from a variety of fields, depending on the interest of the instructor. Students develop a modeling project.

Prerequisites: COM F131X or COM F141X; MATH F252X; WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X.**Recommended:** one or more of MATH F302, MATH F314, MATH F401, MATH F426, STAT F300 or some programming experience.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F490 Senior Seminar**

3 Credits

Offered Spring

Advanced topics selected from areas outside the usual undergraduate offerings. A substantial level of mathematical maturity is assumed.

Prerequisites: COM F131X or COM F141X; at least one of MATH F401 or MATH F405; senior standing.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F600 Teaching Seminar**

1 Credit

Offered Fall

Fundamentals of teaching mathematics in a university setting. Topics may include any aspect of teaching: university regulations, class and lecture organization, testing, book selection, teaching evaluations, etc. Specific topics will vary on the basis of student and instructor interest. Individual classroom visits will also be used for class discussion.

Prerequisites: Graduate standing.**Lecture + Lab + Other:** 1 + 0 + 0**Grading System:** Pass/Fail Grades**Repeatable for Credit:** May be taken 2 times for up to 2 credits

MATH F614 Numerical Linear Algebra

3 Credits

Offered Fall Odd-numbered Years

Algorithms and theory for stable and accurate computation using matrices and vectors on computers. Matrix factorizations, direct and iterative methods for solving linear systems, least squares, eigenvalue and singular value decompositions. Practical implementation and application of algorithms.

Prerequisites: MATH F314.**Recommended:** MATH F401 or MATH F432.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F615 Numerical Analysis of Differential Equations**

3 Credits

Offered Spring Odd-numbered Years

Review of numerical differentiation and integration, and the numerical solution of ordinary differential equations. Main topics to include the numerical solution of partial differential equations, curve fitting, splines, and the approximation of functions. Supplementary topics such as the numerical method of lines, the fast Fourier transform, and finite elements may be included as time permits and interest warrants.

Prerequisites: CS F201; MATH F314; MATH F410; MATH F426; MATH F432.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F617 Functional Analysis**

3 Credits

Offered Spring Even-numbered Years

Study of Banach and Hilbert spaces, and continuous linear maps between them. Linear functionals and the Hahn-Banach theorem. Applications of the Baire Category theorem. Compact operators, self adjoint operators, and their spectral properties. Weak topology and its applications.

Prerequisites: MATH F314; MATH F401.**Recommended:** MATH F410; MATH F641.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F631 Algebra I**

4 Credits

Offered Fall Even-numbered Years

Rigorous development of groups, rings and fields.

Prerequisites: MATH F405.**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F632 Algebra II**

3 Credits

Offered Spring Odd-numbered Years

Advanced topics which may be chosen from group theory, Galois theory, commutative or non-commutative algebra, algebraic geometry, homological algebra or other areas.

Prerequisites: MATH F631.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F641 Real Analysis**

4 Credits

Offered Fall Odd-numbered Years

General theory of Lebesgue measure and Lebesgue integration on the real line. Convergence properties of the integral. Introduction to the general theory of measures and integration. Differentiation, the product measures and an introduction to LP spaces.

Prerequisites: MATH F401.**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F645 Complex Analysis**

4 Credits

Offered Spring Even-numbered Years

Analytic functions, power series, Cauchy integral theory, residue theorem. Basic topology of the complex plane and the structure theory of analytic functions. The Riemann mapping theorem. Infinite products.

Prerequisites: MATH F641.**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F651 Topology**

4 Credits

Offered Spring Odd-numbered Years

Treatment of the fundamental topics of point-set topology. Separation axioms, product and quotient spaces, convergence via nets and filters, compactness and compactifications, paracompactness, metrization theorems, countability properties, and connectedness. Set theory as needed for examples and proof techniques.

Prerequisites: MATH F401 or MATH F404.**Lecture + Lab + Other:** 4 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**MATH F658 Topics in Geometry**

3 Credits

Offered Fall Even-numbered Years

Elective topics in geometry. Recent offerings include configurations of points and lines; topology and differential geometry of surfaces; polyhedra and polytopes.

Prerequisites: Linear algebra; geometry; undergraduate real analysis; undergraduate abstract algebra.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus**Repeatable for Credit:** May be taken 2 times for up to 6 credits**MATH F660 Advanced Mathematical Modeling**

3 Credits

Offered Spring Even-numbered Years

The mathematical formulation and analysis of problems arising in the physical, biological, or social sciences. The focus area of the course may vary, but emphasis will be given to modeling assumptions, derivation of model equations, methods of analysis, and interpretation of results for the particular applications. Examples include heat conduction problems, random walk processes, molecular evolution, perturbation theory. Students will develop a modeling project as part of the course requirements.

Prerequisites: Permission of instructor.**Lecture + Lab + Other:** 3 + 0 + 0**Grading System:** Letter Grades with option of Plus/Minus

MATH F661 Optimization

3 Credits

Offered Fall Even-numbered Years

Linear and nonlinear programming, simplex method, duality and dual simplex method, post-optimal analysis, constrained and unconstrained nonlinear programming, Kuhn-Tucker conditions. Applications to management, physical and life sciences. Computational work with the computer.

Prerequisites: Knowledge of calculus, linear algebra and computer programming.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F663 Graph Theory

3 Credits

Offered Fall Odd-numbered Years

A survey of modern techniques in graph theory; topics may include graphs and digraphs, trees, spanning trees, matchings, graph connectivity, graph coloring, planarity, cycles, and extremal problems.

Prerequisites: MATH F314; MATH F320.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

MATH F665 Topics in Graduate Mathematics

3 Credits

Offered As Demand Warrants

Elective courses in graduate mathematics offered by faculty on a rotating basis. Topics may include, but are not limited to, graph theory, glaciology modeling, general relativity, mathematical biology, Galois theory and numerical linear algebra. May be repeated for credit with permission of instructor.

Lecture + Lab + Other: 3 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Repeatable for Credit: May be taken 3 times for up to 9 credits

MATH F692 Seminar

1-6 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Letter Grades with option of Plus/Minus

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F698 Non-thesis Research/Project

1-6 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits

MATH F699 Thesis

1-9 Credits

Lecture + Lab + Other: 0 + 0 + 0

Grading System: Pass/Fail Grades

Repeatable for Credit: May be taken unlimited times for up to 99 credits