

MATHEMATICS (MTH)

 - General Education Course

MTH 102 Prep for College Math B **4 Credit hours**

A mastery-based course that will prepare students for college algebra.

Grade Mode: Normal Grading Mode

MTH 102B Abr Prep for College Math B **1 Credit hour**

An abridged mastery-based course that will prepare students for College Algebra.

Pre-req: MTH 098 with a minimum grade of CR or MTH 100 or MTH 121B or MTH 121 or Placement Math After SP17 with a score of 100.

Grade Mode: Normal Grading Mode

MTH 121 Concepts and Applications (CT) **3 Credit hours**

Critical thinking course for non-science majors that develops quantitative reasoning skills. Topics include logical thinking, problem-solving, linear modeling, beginning statistics and probability, exponential and logarithmic models, formula use, and financial concepts.

Pre-req: ACT Math with a score of 19 or SAT Mathematics Before Mar. 16 with a score of 460 or MTH 0XX or Placement Math with a score of 100 or Placement Math After SP17 with a score of 101 or Placement Math SP20 with a score of 241 or Math Workshop-UC with a score of 100 or WMTH 002 with a minimum grade of C or MTH 099 with a minimum grade of CR or MTH 102 with a minimum grade of C or MTH 100 with a minimum grade of C or MTH 102B with a minimum grade of C or SAT MATH SECTION SCORE with a score of 510.

Attributes: Critical Thinking, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 121B Cncpts & Apps-Expanded (CT) **4 Credit hours**

Critical thinking course for non-science majors that develops quantitative reasoning skills. Topics include logical thinking, linear modeling, statistics and probability, exponential and logarithmic modeling, and financial concepts, with arithmetic review.

Attributes: Critical Thinking, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 121H Concepts and Applications **3 Credit hours**

Pre-req: ACT Math with a score of 23 or SAT Mathematics Before Mar. 16 with a score of 540.

Attributes: Honors

Grade Mode: Normal Grading Mode

MTH 122 Plane Trigonometry **3 Credit hours**

Definitions of circular functions; graphs to trigonometric functions, trigonometric identities, and applications.

Pre-req: ACT Math with a score of 22 or SAT Mathematics Before Mar. 16 with a score of 520 or SAT MATH SECTION SCORE with a score of 540 or Placement Math After SP17 with a score of 103 or Placement Math SP20 with a score of 257 or MTH 127 with a minimum grade of C or MTH 130 (may be taken concurrently) with a minimum grade of C.

Concurrent PR: MTH 130

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 127 College Algebra-Expanded **5 Credit hours**

A brief but careful review of the main techniques of algebra.

Polynomials, rational, exponential, and logarithmic functions. Graphs, equations and inequalities, sequences.

Pre-req: ACT Math with a score of 17 or SAT Mathematics Before Mar. 16 with a score of 400 or SAT MATH SECTION SCORE with a score of 460 or Placement Math After SP17 with a score of 101 or Placement Math SP20 with a score of 237 or MTH 0XX or Placement Math with a score of 100 or Math Workshop-UC with a score of 100 or WMTH 002 or MTH 099 with a minimum grade of CR or MTH 102 with a minimum grade of C or MTH 102B with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 130 College Algebra **3 Credit hours**

Polynomial, rational, exponential, and logarithmic functions. Graphs, equations and inequalities, sequences.

Pre-req: ACT Math with a score of 21 or SAT Mathematics Before Mar. 16 with a score of 500 or SAT MATH SECTION SCORE with a score of 530 or Placement Math After SP17 with a score of 102 or Placement Math SP20 with a score of 250.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 132 Precalculus with Sci Applica **5 Credit hours**

Functions used in calculus including polynomial, rational, exponential, logarithmic, and trigonometric. Systems of equations and inequalities, conic sections, polar and parametric equations, sequences and series, Binomial Theorem.

Pre-req: ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 570 or Placement Math After SP17 with a score of 104 or Placement Math SP20 with a score of 263 or MTH 127 with a minimum grade of C or MTH 130 with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 140 Applied Calculus **3 Credit hours**

A brief survey of calculus including both differentiation and integration with applications. Not to be substituted for Mathematics 131 or Mathematics 190.

Pre-req: ACT Math with a score of 24 or SAT Mathematics Before Mar. 16 with a score of 560 or SAT MATH SECTION SCORE with a score of 570 or Placement Math After SP17 with a score of 104 or Placement Math SP20 with a score of 263 or MTH 127 with a minimum grade of C or MTH 130E with a minimum grade of C or MTH 130 with a minimum grade of C or MTH 130H with a minimum grade of C or MTH 132 with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 140H Applied Calculus Honors **3 Credit hours**

A brief survey of calculus including both differentiation and integration with applications. This honors course will also introduce topics from differential equations with applications.

Pre-req: ACT Math with a score of 25 or SAT Mathematics Before Mar. 16 with a score of 570 or SAT MATH SECTION SCORE with a score of 590.

Attributes: Honors, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 160 🌱 Applied Math Reasoning (CT)**5 Credit hours**

A critical thinking course in applied mathematical reasoning. Topics include logic, problem solving, linear modeling, beginning statistics and probability, exponential and logarithmic modeling, formula use.

Pre-req: SAT Mathematics Before Mar. 16 with a score of 400 or ACT Math with a score of 17 or SAT MATH SECTION SCORE with a score of 460 or Placement Math After SP17 with a score of 101 or Placement Math SP20 with a score of 237 or MTH 099 with a minimum grade of CR or MTH 102 with a minimum grade of C or MTH 102B with a minimum grade of C or MTH 127 with a minimum grade of C.

Attributes: Critical Thinking, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 220 Discrete Structures**3 Credit hours**

Pre-req: ACT Math with a score of 27 or SAT Mathematics Before Mar. 16 with a score of 610 or SAT MATH SECTION SCORE with a score of 630 or Placement Math After SP17 with a score of 105 or Placement Math SP20 with a score of 276 or MTH 132 with a minimum grade of C or MTH 140 with a minimum grade of C or MTH 229 with a minimum grade of C or MTH 229H with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 229 🌱 Calculus/Analytic Geom I (CT)**5 Credit hours**

An introduction to calculus and analytic geometry, emphasizing critical thinking. Limits, derivatives, and integrals of the elementary functions of one variable, including transcendental functions.

Pre-req: ACT Math with a score of 27 or SAT Mathematics Before Mar. 16 with a score of 610 or SAT MATH SECTION SCORE with a score of 630 or Placement Math After SP17 with a score of 105 or Placement Math SP20 with a score of 276 or MTH 132 with a minimum grade of C.

Attributes: Critical Thinking, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 229H 🌱 Calculus I Honors (CT)**5 Credit hours**

An introduction to calculus and analytic geometry for honors students, emphasizing critical thinking. Limits, derivatives, and integrals of the elementary functions of one variable, including transcendental functions.

Pre-req: ACT Math with a score of 27 or SAT Mathematics Before Mar. 16 with a score of 610 or SAT MATH SECTION SCORE with a score of 630.

Attributes: Critical Thinking, Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 230 Calculus/Analytic Geom II**4 Credit hours**

A study of the conics and transcendental functions, techniques of integration, improper integrals, indeterminate forms and infinite series.

Pre-req: MTH 229 with a minimum grade of C or IST 230 or MTH 229H with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 231 Calculus/Analytic Geom III**4 Credit hours**

Analytic geometry of two and three dimensions, partial differentiation, and multiple integrals.

Pre-req: MTH 230 with a minimum grade of C.

Attributes: Core II Mathematics

Grade Mode: Normal Grading Mode

MTH 300 🌱 Intro to Higher Math**4 Credit hours**

A transition between elementary calculus and higher mathematics with emphasis on techniques of proofs. (PR or CR: MTH 231 or equivalent)

Pre-req: MTH 230 with a minimum grade of C.

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 329 🌱 Elementary Linear Algebra**3 Credit hours**

Systems of linear equations, matrices and determinants, vector spaces, linear transformations, eigenvalues, eigenvectors, and applications.

Pre-req: ACT Math with a score of 27 or SAT Mathematics Before Mar. 16 with a score of 610 or SAT MATH SECTION SCORE with a score of 630 or IST 131 with a minimum grade of C or (MTH 122 with a minimum grade of C and MTH 127 with a minimum grade of C) or (MTH 122 with a minimum grade of C and MTH 130 with a minimum grade of C) or MTH 132 with a minimum grade of C or MTH 229 with a minimum grade of C or MTH 229H with a minimum grade of C.

Attributes: Mathematics, No Textbook Required

Grade Mode: Normal Grading Mode

MTH 331 🌱 Linear Algebra**4 Credit hours**

Vector spaces, matrices and determinants, linear transformations, eigenvalues and eigenvectors, and applications.

Pre-req: MTH 300 (may be taken concurrently) with a minimum grade of C.

Concurrent PR: MTH 300

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 335 🌱 Ordinary Diff Equations**3 Credit hours**

A study of differential equations, their solutions, and applications to physical systems, emphasizing closed-form solving methods. Laplace transforms, orthogonal functions, approximation and numerical methods with applications.

Pre-req: MTH 230 with a minimum grade of C.

Attributes: Mathematics, No Textbook Required

Grade Mode: Normal Grading Mode

MTH 360 🌱 Intro to Complex Variables**3 Credit hours**

An introductory survey of complex numbers, analytic functions, properties of elementary functions, integrals, series, residues and poles, with a focus on practical applications.

Pre-req: MTH 231 with a minimum grade of C.

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 361 🌱 Vector Calculus**3 Credit hours**

A course in n-dimensional calculus: the derivative, the integral, and applications. Coordinate-free methods are emphasized.

Pre-req: MTH 231 with a minimum grade of C.

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 400 🌱 Structure of Algebra**3 Credit hours**

Emphasis on the language of Modern Elementary Algebra.

Recommended for pre-service elementary teachers and for elementary and secondary in-service teachers. May not be used for either a degree offered by the Department of Mathematics or for a 7-9 or 7-12 mathematics specialization.

Pre-req: MTH 130 with a minimum grade of C.

Attributes: Mathematics

Grade Mode: Normal Grading Mode

- MTH 401 🌿 Structure Modern Geometry** **3 Credit hours**
 Informal development of geometry. Recommended for pre- service elementary teachers and for elementary and secondary in-service teachers. May not be used for either a degree offered by the Department of Mathematics or for a 7-9 or 7-12 mathematics specialization.
Pre-req: MTH 130 with a minimum grade of C or MTH 127 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 404 🌿 Math Methods and Materials** **3 Credit hours**
 Content and content-specific pedagogy for secondary mathematics education majors.
Pre-req: Admitted to Teacher ED with a score of 5.
Co-req: CI 470
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 405 🌿 History of Mathematics** **3 Credit hours**
 A study of the history of mathematics from the time of the ancient Greeks to the end of the nineteenth century.
Pre-req: MTH 300 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 411 🌿 Mathematical Modeling** **3 Credit hours**
 Students work in teams to construct mathematical models of various real-world situations. Problems to be modeled are drawn from diverse areas of application and use a wide range of undergraduate mathematics.
Pre-req: MTH 231 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 415 🌿 Partial Differential Equations** **3 Credit hours**
 Differential equations. Heat Equation, Laplace's Equation, separation of variables, Fourier series, vibrating strings, eigenvalue problems, finite differences, Bessel functions, Legendre polynomials.
Pre-req: MTH 331 with a minimum grade of C and MTH 335 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 416 Advanced Differential Equation** **3 Credit hours**
 Differential equations are studied qualitatively. Topics include the existence and uniqueness of solutions and the behavior of solutions including stability of nonlinear systems, periodic solutions, and approximation using perturbation methods.
Pre-req: MTH 300 and MTH 335.
Grade Mode: Normal Grading Mode
- MTH 427 🌿 Advanced Calculus I** **3 Credit hours**
 The number system, limits, sequences, partial differentiation with applications, maxima and minima of functions of several variables. Theory of definite integrals, multiple integrals, line and surface integrals, improper integrals, infinite series.
Pre-req: MTH 231 with a minimum grade of C and MTH 300 with a minimum grade of C and MTH 331 (may be taken concurrently) with a minimum grade of C.
Concurrent PR: MTH 331
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 428 🌿 Advanced Calculus II** **3 Credit hours**
 The number system, limits, sequences, partial differentiation with applications, maxima and minima of functions of several variables. Theory of definite integrals, multiple integrals, line and surface integrals, improper integrals, infinite series.
Pre-req: MTH 427 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 430 🌿 Topology I** **3 Credit hours**
 First course in topology. Basics of point-set topology: metric and topological spaces, continuity, connectedness, compactness, products, quotients. Surfaces and simplicial complexes, Euler characteristics.
Pre-req: MTH 300 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 431 🌿 Topology II** **3 Credit hours**
 First course in algebraic topology. Homotopy, fundamental group, simplicial homology.
Pre-req: MTH 430 with a minimum grade of C and MTH 450 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 440 🌿 Graph Th and Combinatorics** **3 Credit hours**
 This course is designed to introduce students in mathematical sciences to the theorems, techniques, and applications of graph theory and combinatorics.
Pre-req: MTH 300 (may be taken concurrently) with a minimum grade of C.
Concurrent PR: MTH 300
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 442 🌿 Numerical Linear Algebra** **3 Credit hours**
 Direct an iterative methods for numerical solution of linear systems of equations. Eigenvalues and eigenvectors. Error Analysis and norms. Related topics.
Pre-req: MTH 331 with a minimum grade of C.
Attributes: Mathematics, No Textbook Required
Grade Mode: Normal Grading Mode
- MTH 443 🌿 Numerical Analysis** **3 Credit hours**
 The theory and technique of numerical computation involving the difference calculus, the summation calculus, interpolation methods, solution of systems of equations, and methods of solution of ordinary differential equations.
Pre-req: MTH 331 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 448 🌿 Modern Geometries** **3 Credit hours**
 Finite geometrics, basic background material for the modern development of Euclidean Geometry, other geometries.
Pre-req: MTH 300 with a minimum grade of C.
Attributes: Mathematics
Grade Mode: Normal Grading Mode
- MTH 449 🌿 Projective Geometry** **3 Credit hours**
 Projective Geometry using both synthetic and algebraic methods.
Pre-req: MTH 300 with a minimum grade of C.
Attributes: Mathematics, No Textbook Required
Grade Mode: Normal Grading Mode

MTH 450 🌿 Modern Algebra I 3 Credit hours

Structure of the abstract mathematical systems; groups, rings, fields, with illustrations and applications from number theory.

Pre-req: MTH 300 with a minimum grade of C and MTH 331 (may be taken concurrently) with a minimum grade of C.

Concurrent PR: MTH 331

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 452 🌿 Modern Algebra II 3 Credit hours

Continuation of MTH 450.

Pre-req: MTH 450 with a minimum grade of C.

Attributes: Mathematics

Grade Mode: Normal Grading Mode

MTH 455 Number Theory 3 Credit hours

A survey of some basic properties of the integers: divisibility (prime numbers, factorization, perfect numbers), congruences (modular arithmetic, linear and quadratic congruences, the Chinese Remainder Theorem), and Diophantine equations.

Pre-req: MTH 300 with a minimum grade of C.

Grade Mode: Normal Grading Mode

MTH 480 🌿 Special Topics 1-4 Credit hours

Attributes: Mathematics, No Textbook Required

Grade Mode: Normal Grading Mode

MTH 485 🌿 Independent Study 1-4 Credit hours

Attributes: Mathematics, No Textbook Required

Grade Mode: Normal Grading Mode

MTH 490 🌿 Internship in Mathematics 2-12 Credit hours

A supervised internship in an area of mathematics, applied mathematics, or statistics. By permission only.

Pre-req: MTH 300 with a minimum grade of D.

Attributes: Capstone Course, No Textbook Required

Grade Mode: Normal Grading Mode

MTH 491 🌿 Senior Seminar 2 Credit hours

Capstone experience in reading, doing writing and speaking mathematics. Student will explore topics related to a theme chosen by the instructor.

Pre-req: MTH 300 with a minimum grade of D.

Attributes: Capstone Course, Mathematics, No Textbook Required

Grade Mode: Normal Grading Mode