MATHEMATICS (MATH)

MATH 0300. Pre-Algebra. 3 Hours.
This course provides a study of the concepts and applications of arithmetic operations on whole numbers, fractions, and decimals, ratios and proportions, percentages, measurements, interpretation of graphs and statistics, geometry, exponents, algebraic expression, and problem solving. Students must complete the course with a C or better to receive credit. Calculators will not be allowed for use in this course. Placement will be determined by TSI readiness indicators.

MATH 0301. Elementary Algebra. 3 Hours.
This course provides a study of the concepts and applications of algebraic expressions, equations, inequalities, problem solving, polynomials and factoring, rational expressions and equations, systems of equations, graphing techniques, radical expressions and equations, and quadratic equations. Students must complete the course with a C or better to receive credit. Appropriate computer software and hand held technologies will be utilized. Placement will be determined by TSI readiness indicators.

MATH 0302. Intermediate Algebra. 3 Hours.
This course provides a study of the concepts and applications of rational expressions and equations, linear equations and inequalities, radicals, quadratic equations, and graphs. This course is intended for students who place below the minimum score on an entrance assessment test in mathematics. Appropriate computer software and hand held technologies will be utilized. Students must complete the course with a C or better to receive credit. Placement will be determined by TSI readiness indicators.

MATH 1314. College Algebra. 3 Hours.
This course provides a rigorous study of the concepts and applications of linear, quadratic, higher-order polynomial, rational, radical, exponential and logarithmic functions, and solving systems of equations using various methods. Additional topics such as sequences, series, probability, and conics may be included. This course is designed to prepare STEM majors for success in calculus. Appropriate computer software and hand held technologies will be utilized. Prerequisite: Must have satisfied the math portion of TSI. Placement will also be determined by the Math Placement Exam score.

MATH 1316. Plane Trigonometry. 3 Hours.
This course provides a rigorous study of the concepts and applications of sets, ordered relations, number intervals, trigonometric functions, radian measure, variations and graphs of functions, solutions of right and general triangles, identities, graphing, inverse functions, circular functions, vectors, complex numbers, polar and parametric equations. This course is designed to further prepare STEM majors for success in calculus. Appropriate computer software and hand held technologies will be utilized. Prerequisite: Must have satisfied the math portion of TSI. Placement will also be determined by the Math Placement Exam score.

MATH 1324. Mathematics for Business and Social Sciences I. 3 Hours.
This course provides a rigorous study of the concepts from college algebra (linear equations, quadratic equations, functions and graphs, inequalities), sets, probability, mathematics of finance (simple and compound interest, annuities), linear programming, matrices, and systems of linear equations. This course is designed to prepare students majoring in business or social science. Applications will be taken from management, economics, business, and sociology. Appropriate computer software and hand held technologies will be utilized. Prerequisite: Must have satisfied the math portion of TSI.

MATH 1325. Business Calculus. 3 Hours.
This course provides a rigorous study of the concepts of limits and continuity, derivatives, graphing and optimization, exponential and logarithmic functions, antiderivatives, and integration. This course is designed to prepare students majoring in business. Applications will be taken from management, economics, and business. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 1324 or MATH 1314 with a C or better.

MATH 1332. Contemporary Mathematics I. 3 Hours.
This course provides a study of the concepts and applications of sets, logic, number systems, number theory, relations, functions, probability and statistics. Applications will be taken from meaningful real-world examples that allow students to see how mathematics can be used by everyone to solve problems, not just by mathematicians and scientists. This course is designed for non-STEM, non-business majors. Appropriate computer software and hand held technologies will be utilized. Prerequisite: Must have satisfied the math portion of TSI.

MATH 1342. Elementary Statistical Methods. 3 Hours.
This course provides a rigorous study of the concepts and applications of the collection, analysis, presentation, and interpretation of data and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals and hypothesis testing. Appropriate computer software and hand held technologies will be utilized. Prerequisite: Must have satisfied the math portion of the TSI.

MATH 1350. Fundamentals of Mathematics I. 3 Hours.
This course provides a rigorous study of the concepts and applications of sets, functions, numeration systems, number theory, and properties of the natural numbers, integers, rational, and real number systems with an emphasis on problem solving and critical thinking. This course is designed for students seeking EC-6 teacher certification. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 1314 with a C or better.

MATH 1351. Fundamentals of Math II. 3 Hours.
This course provides a rigorous study of the concepts and applications of geometry, probability, statistics, and measurement with an emphasis on problem solving and critical thinking. This course is designed for students seeking EC-6 teacher certification. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 1350 and MATH 1314 with a C or better.
MATH 2305. Discrete Mathematics. 3 Hours.
This course provides a rigorous study of the concepts and applications of topics designed to prepare math, computer science, and engineering majors for a background in abstraction, notation, and critical thinking for the mathematics most directly related to computer science. Topics include: logic, relations, functions, basic set theory, countability and counting arguments, proof techniques, mathematical induction, combinatorics, discrete probability, recursion, sequence and recurrence, elementary number theory, graph theory, and mathematical proof techniques. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2413 with a C or better.

MATH 2318. Linear Algebra. 3 Hours.
This course provides a rigorous study of the concepts and applications of systems of linear equations, matrices, vector spaces, determinants, eigenvectors, eigenvalues, and linear transformations. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.

MATH 2320. Differential Equations. 3 Hours.
This course provides a rigorous study of the concepts and applications of first- and second-order ordinary differential equations and systems of ODEs, existence and uniqueness of solutions, initial value problems, the Laplace Transform, compartment models, first- and second-order rate laws, eigenvalues, eigenvectors, and eigenspaces of matrices. This course is taught with a modeling perspective and will utilize applications from areas such as physics, biology, pharmacology, chemistry, ecology, sociology, and electric engineering. Numerical, symbolic and graphing techniques will used to obtain solutions. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.

MATH 2412. Pre-Calculus. 4 Hours.
This course provides a rigorous study of the concepts and applications of the fundamental topics of calculus including algebraic functions and their graphs, trigonometric functions and identities, polynomial, rational, exponential, and logarithmic functions, solutions to equations and inequalities, analytic geometry, and polar coordinates. This course is designed to prepare STEM majors for success in calculus. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 1314 with a C or better or the equivalent preparation by STEM department chair permission. Placement will also be determined by the Math Placement Exam score.

MATH 2413. Calculus I. 4 Hours.
This course provides a rigorous study of the concepts and applications of limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental function, with an application to calculation of areas. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 1314 and MATH 1316 with a C or better, or MATH 2412 with a C or better. Placement will also be determined by the Math Placement Exam score.

MATH 2414. Calculus II. 4 Hours.
This course provides a rigorous study of the concepts and applications of integration, trigonometric functions, sequences and series, indeterminate forms, improper integrals, and elementary differential equations. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2413 with a C or better.

MATH 2415. Calculus III. 4 Hours.
This course provides a rigorous study of the concepts and applications of three dimensional analytic geometry and vectors, differentiation and integration of vector-valued functions and motion in space, arc length and curvature, functions of several variables, partial derivatives, multiple integrals, and integration in vector fields. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.

MATH 289. Independent Study in Mathematics. 1-4 Hours.
This course provides an option for individualized instruction and research. It may be repeated when topics vary. Prerequisite: Instructor approval.

MATH 321. College Geometry. 3 Hours.
This course provides a rigorous study of the concepts and applications of the properties of finite geometrics and of points, lines, triangles, and circles in Euclidean geometry. Non-Euclidean geometries will also be studied and contrasted. This course will be taught with a discovery approach in which students scaffold their comprehension through careful axiomatic study. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2413 with a C or better.

MATH 326. Problem Solving for Elementary Teachers. 3 Hours.
This course provides a rigorous study of the concepts of effective problem solving strategies. Strategies will be applied to various problems taken from critical areas of algebra, number concepts, geometry, probability, statistics, measurement, and logic. The scope and sequence will be formative in nature and use a discovery approach to allow students to scaffold their critical thinking skills into a mathematical problem solving rubric. Logical reasoning will be emphasized in all strategies to distinguish the importance of the process of problem solving rather than just finding the answer. Appropriate computer software and hand held technologies will be utilized. With pre-service elementary teachers in mind, this course will also integrate the pedagogy of modeling these skills to elementary mathematics students. Prerequisite: MATH 1314 and MATH 1350 and MATH 1351 with a C or better.

MATH 334. Introduction to Abstract Algebra. 3 Hours.
This course provides a rigorous study of the concepts and applications of the properties of the integers, permutations, groups, rings, integral domains, and fields. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.
MATH 352. Math Foundations and Applications. 3 Hours.
This course provides a rigorous study and review of the concepts of algebra, geometry, probability, statistics, trigonometry, and calculus. Other topics may include elements from number theory, linear algebra, and abstract algebra. This course will be driven by applications of real-world problems with an emphasis on problem-solving skills. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2413 with a C or better.

MATH 357. Probability and Statistics. 3 Hours.
This course provides a rigorous study of the concepts and applications of probability, discrete and continuous distribution, estimation, and hypothesis testing using concepts from calculus. Appropriate computer software and hand held technologies will be utilized. Course is cross-listed with EE 307. Prerequisite: MATH 2414 with a C or better.

MATH 380. Real Analysis. 3 Hours.
Sets, relations and functions, sequences of real numbers and sequences in Rn, continuous and differentiable functions on Rn, Riemann Integral. Prerequisites: MATH 2415 and MATH 2305.

MATH 415. Numerical Analysis. 3 Hours.
This course provides a rigorous study of the concepts and applications of the use of numerical methods for the solution of mathematical problems such as linear systems of equations, curve fitting, root finding, differentiation, and integration. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 and COSC 1315 with a C or better.

MATH 426. Problem Solving. 3 Hours.
Effective problem solving strategies will be applied to various examples from areas such as algebra, geometry, probability, calculus, trigonometry, number theory, discrete math, linear algebra, and logic. The scope and sequence will be formative in nature and use a discover approach to allow students to scaffold their critical thinking skills into a mathematical problem solving rubric. Logical reasoning will be emphasized in all strategies to distinguish the importance of the process of problem solving rather than just finding the answer. Appropriate computer software and hand held technologies will be utilized. With pre-service math teachers in mind, this course will also focus on the pedagogy of teaching these skills to 7-12 grade mathematics students. Prerequisite: MATH 2414 with a C or better.

MATH 430. Mathematical Modeling. 3 Hours.
This course provides a rigorous study of the concepts and applications of techniques used to model data related to real-world systems and scenarios from areas such as physics, biology, pharmacology, chemistry, ecology, sociology, astronomy, and archeology. Discrete and continuous models, theoretical and empirical models, deterministic and probability models and analytic and simulation models will be considered. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.

MATH 431. Internship in Mathematics. 3 Hours.
The internship is a work experience that will allow the student to develop skills, gain hands-on business experience, and test career choices and options. The internship will complement and validate the student's academic training.

MATH 437. Number Theory. 3 Hours.
This course provides a rigorous study of the concepts and applications of the properties of integer representations and operations, analysis and complexity of algorithms, mathematical induction, divisibility, primes and composites, congruences and systems, the Fundamental Theorem of Arithmetic, Pythagorean triples, multiplicative functions, and cryptology. Appropriate computer software and hand held technologies will be utilized. Prerequisite: MATH 2414 with a C or better.

MATH 489. Individual Study. 1-3 Hours.
This course provides an option for individualized instruction and research. It may be repeated when topics vary. Prerequisite: Instructor approval.

MATH 493. Capstone in Mathematics. 3 Hours.
This is the conclusion of preparation of a portfolio of mathematical experiences composed of artifacts from throughout a student’s time in upper-level mathematics classes. Presentation of a selected portfolio artifact will be required. Students will be graded on Satisfactory (S) or Unsatisfactory (U) basis. Prerequisite: Senior standing and instructor permission.

MATH 499. Independent Research. 1-6 Hours.
This is an independent research in Math conducted by a student under the guidance of a faculty member of his or her choice. The student is required to maintain a research journal and submit a project report by the end of the semester and potentially make an oral presentation on the project. SCH and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.

MATH 525. Advanced Geometry. 3 Hours.
This course provides a rigorous study of the concepts and applications of advanced geometries other than Euclidean. A research component will be required. Appropriate computer software and hand held technologies will be utilized. Prerequisite: At least 24 hours of undergraduate mathematics including a course comparable to College Geometry.

MATH 533. Algebraic Structures. 3 Hours.
This course provides a rigorous study of the concepts and applications of common algebraic structures. A research component will be required. Appropriate computer software and hand held technologies will be utilized. Prerequisite: At least 24 hours of undergraduate mathematics including a course comparable to Discrete Mathematics.
MATH 537. Vector Spaces and Linear Transformation. 3 Hours.
This course provides a rigorous study of the concepts and applications of vector spaces and linear transformations from a more algebraic and theoretical viewpoint. A research component will be required. Appropriate computer software and hand held technologies will be utilized. Prerequisite: At least 24 hours of undergraduate mathematics including a course comparable to Linear Algebra.

MATH 545. Analysis. 3 Hours.
This course provides a rigorous study of the concepts and applications of the underpinnings of calculus from an advanced theoretical viewpoint. A research component will be required. Appropriate computer software and hand held technologies will be utilized. Prerequisite: At least 24 hours of undergraduate mathematics including two courses comparable to Calculus I and Calculus II.

MATH 589. Independent Study. 3 Hours.
This course provides an option for individualized instruction and research. It may be repeated when topics vary. Prerequisite: Instructor approval.

MATH 597. Special Topics. 3 Hours.
This is an organized class and may be repeated when topics vary. Prerequisite: Instructor approval.

MATH 599. Independent Research. 1-6 Hours.
This is an independent research in Math conducted by a student under the guidance of a faculty member of his or her choice. Credits and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.