MATHEMATICS (MAT)

MAT 095   Mathematics Workshop 2 credits
This course is not a general education course and should only be taken by students planning to take a course with MAT095 listed as a prerequisite. The goal of this course is to strengthen basic math skills in preparation for future math courses. The course begins by reviewing operations with whole numbers, fractions, and signed numbers. The course builds to simplifying algebraic expressions, solving linear equations, and solving problems with percents. Students must earn a minimum grade of C- in this course to progress to the next level Math course. (Credit for this course does not apply to degree requirements.)

MAT 101   Contemporary Mathematics 3 credits
This course was designed to give the liberal arts student an experience in contemporary mathematics with emphasis on its connection to society. The concepts include financial mathematics, statistics, apportionment, voting, graphs and networks. (Prerequisite: Minimum grade of C- in MAT 095 or level 2 or higher placement on the Math Placement Exam.)

MAT 103   Beginning Algebra 2 credits
This course is not a general education course and should only be taken by students planning to take a course with MAT103 listed as a prerequisite. Topics include calculator skills, combinatorics, linear equations and systems of linear equations, story problems, function notation, exponentials and logarithms. Students must earn a minimum grade of C- in this course to progress to the next level Math course. (Prerequisite: Minimum grade of C- in MAT095 or level 2 placement on the Math Placement Exam.)

MAT 105   Intermediate Algebra 2 credits
This course is not a general education course and should only be taken by students planning to take a course with MAT 105 listed as a prerequisite. Topics include properties of exponents, polynomials, factoring, radicals, rational equations, and graphing functions. Students must earn a minimum grade of C- in this course to progress to the next level Math course. (Prerequisite: A minimum grade of C- in MAT 103 or level 3 placement on the Math Placement Exam)

MAT 110   Introduction to Probability and Statistics 3 credits
This course will explore fundamental topics from probability and descriptive and inferential statistics and apply these to a range of areas of study including business, social science, and biology. Topics include probability and counting rules, probability distributions, hypothesis testing, correlation, regression, chi-square, and analysis-of-variance. (Prerequisite: Minimum grade of C- in MAT 103 or level 3 or higher placement on the Math Placement Exam.)

MAT 125   Precalculus 4 credits
This course emphasizes functions and their applications. It starts with investigating graphs and solutions of the algebraic functions including polynomial, rational, and root functions. The course continues by exploring transcendental functions including exponential, logarithmic, and trigonometric functions. The course concludes with a study of conic sections. The course is a good preparation for Calculus and for those students who will encounter functions in their course of study. Students must earn a minimum grade of C- in this course to progress to the next level Math course. (Prerequisite: Minimum grade of C- in MAT 100 or MAT 105 or level 4 or higher placement on the Math Placement Exam)

MAT 135   Calculus I 4 credits
This course explores the concepts of limit and continuity, investigates techniques of differentiation and its applications, introduces integration, and provides the framework for the Fundamental Theorem. (Prerequisite: Minimum grade of C- in MAT 125 or level 5 placement on the Math Placement Exam.)

MAT 145   Calculus II 5 credits
This course is a continuation of MAT 135. Topics covered include techniques of integration, an introduction to differential equations, sequences and series and applications of these concepts. Other topics include parametric equations, polar equations, and conic sections. Students will be introduced to a computer algebra system. (Prerequisite: Minimum grade of C- in MAT 135 or equivalent)

MAT 165   Quantitative Reasoning for Health Care Professionals 3 credits
This course is designed to meet the quantitative needs of students pursuing majors in health care. The course will include a review of essential math concepts needed for dosage calculation including: fractions, percentages, measurements, conversions, and ratios. This course will help students in applying basic mathematical concepts to real world situations. Dosage accuracy is highlighted in scenarios that employ critical thinking skills. The course will also include a basic introduction to the statistical concepts of mean, median, mode, standard deviation, and z-scores, with an emphasis on medical examples. (Prerequisites: Minimum grade of C- in MAT 095 or level 2 placement on the Math Placement Exam.)

MAT 200   Foundations of Elementary Mathematics 4 credits
This course gives students the mathematical foundation necessary to teach K-6 mathematics and to prepare for the Minnesota Teaching Licensure Basic Skills Exam. Topics include basic algebra, set theory, probability, statistics, geometry, and problem-solving techniques. (Prerequisite: Minimum grade of C- in MAT 100 or MAT 105 or level 4 placement on the Math Placement Exam.)

MAT 201   Elementary Mathematics: Numbers and Functions 3 credits
Mathematics content knowledge for K-6 classrooms presented using methods that deepen students' understanding of the content and prepare students to present the material in their future classrooms. The course will emphasize problem solving, making connections, communication, reasoning, and using multiple representations. Content focus areas include: functions, graphs, proportions, and number sense. This course can be taken before, after, or at the same time as MAT202.

MAT 202   Elementary Mathematics: Geometry and Statistics 3 credits
Mathematics content knowledge for K-6 classrooms presented using methods that deepen students' understanding of the content and prepare students to present the material in their future classrooms. The course will emphasize problem solving, making connections, communication, reasoning, and using multiple representations. Content focus areas include: geometry, measurement, probability, statistics. This course can be taken before, after, or at the same time as MAT201.

MAT 220   Discrete Mathematics 3 credits
This course serves as an introduction to formal proofs and is prerequisite for several upper level math courses. Additional topics covered include logic, set theory, function and relations. (Prerequisite: C- or better in MAT 135 or CSC 175)

MAT 255   Calculus III 4 credits
This course is a continuation of MAT 145. Topics covered include analytic geometry in three-dimensional space, vector calculus, partial differentiation, multiple integration, the Fundamental Theorems, and related applications. (Prerequisite: Minimum grade of C- in MAT 145)

MAT 305   Foundations of Geometry 3 credits
This course provides a systematic survey of Euclidean, hyperbolic, transformation, and fractal geometries. Through the use of technology, the students are better enabled to construct, analyze, and prove conjectures. (Corequisite: MAT 220 or previous completion of MAT 220 with a minimum grade of C-)

MAT 330   Advanced Probability and Statistics 4 credits
This course is a Calculus-based look at Probability and Statistics. Assuming students have been exposed to the basics through an introductory course, this course will build upon that experience. Topics include an in depth investigations of probability, discrete and continuous random variables, parameter estimation, hypothesis testing, inference using the normal and binomial distributions, goodness of fit, regression and correlation, and ANOVA. The course will include a statistical software component. (Prerquisites: Minimum grade of C- in MAT 145 and MAT 110)

MAT 333   Financial Mathematics 3 credits
Topics covered include the mathematical theory behind the time value of money, the force of interest, annuities, yield rates, amortization schedules, bonds, contracts, options, swaps, and arbitrage. This course also helps prepare students for the Financial Mathematics actuary exam. (Prerequisite: Minimum grade of C- in MAT 135, Co-requisite: MAT 145).

MAT 375   Differential Equations and Linear Algebra 4 credits
This course is an overview of the concepts of differential equations and linear algebra necessary to solve applied problems. Topics include: Differential equations: separable, first-order linear, higher-order linear, linear systems with constant coefficients. Linear algebra: basis, dimension, matrices, eigenvalues/eigenvectors, and vector spaces. (Prerequisite: Minimum of C- in MAT 145)

MAT 450   Abstract Algebra 4 credits
This course is a rigorous introduction to abstract algebra. Topics include mappings, groups, equivalence relations, isomorphisms, rings, and fields. (Prerequisite: Minimum grade of C- in MAT 220)

MAT 478   Mathematics Seminar 3 credits
Students in this seminar will explore a variety of exciting mathematics problems. The course will be offered every spring but the topic will vary depending on the interests of the faculty member and the students. Students will sharpen their mathematical abilities by exploring an assortment of problem-solving strategies and clearly presenting generalized solutions. The opened-ended course number allows for more than one such experience. (Prerequisite: Minimum grade of C- in MAT 220 or consent of instructor)

MAT 488   Independent Study in Mathematics 1-4 credits
There are a plethora of topics in mathematics an advanced student could explore such as Difference Equations, Combinatorics, Graph Theory, Chaos Theory, Optimization, Operations Research, or Cryptography to name a few. The opened ended course number allows for more than one such experience. The student will work with a faculty mentor to choose an appropriate course, number of credits, and assessment scheme.

MAT 498   Mathematics Internship 1-16 credits
An exemplary real-world experience which allows for a deeper understanding of the mathematics used in a student's field of interest.

MAT 499   Senior Outcomes 0 credits