# MTH Mathematics

**MTH 041 Enhanced Supplemental Math for Quantitative Literacy (1-2) 2 crs.**
Provides mathematical support for students in MTH 101 who place below the Intermediate Algebra level. Carries no transfer credit.
**Prerequisite:** ENG 094, ENG 096 or higher, or equivalent English placement. https://www.harpercollege.edu/testing/english-placement-grid.php
**Corequisite:** MTH 101.

**MTH 065 Algebraic Modeling (4-0) 4 crs.**
Develops conceptual understanding of number systems, algebraic expressions, equations, inequalities and graphs of equations. Develops algebra skills with an emphasis on data modeling throughout the course. Carries no transfer credit.
**Prerequisite:** Math placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 070 Plane Geometry (2-0) 2 crs.**
Introduces concepts of Euclidean plane geometry, including lines, angles, polygons and circles. Carries no transfer credit.
**Prerequisite:** MTH 065 (Algebraic Modeling) with a grade of C or better, or concurrent enrollment in MTH 065 (Algebriac Modeling), or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 081 Supplemental Math/Quantitive Literacy (1-0) 1 cr.**
Provides mathematical support for students in MTH 101 who place at the Intermediate Algebra level. Carries no transfer credit.
**Prerequisite:** MTH 065 (Algebraic Modeling) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php
**Corequisite:** MTH 101.

**MTH 083 Supplemental Math/College Algebra (2-0) 2 crs.**
Provides mathematical support for students in MTH 103 (College Algebra) who place slightly below college level. Carries no transfer credit.
**Prerequisite:** MTH 065 (Algebraic Modeling) with a grade of B or better, or an ALEKS score between 35 and 45. https://www.harpercollege.edu/testing/mathplacement.php
**Corequisite:** MTH 103.

**MTH 085 Supplemental Math/Elementary Statistics (1-0) 1 cr.**
Provides mathematical support for students in MTH 165 (Elementary Statistics) who place at the Intermediate Algebra level.
**Prerequisite:** MTH 065 (Algebraic Modeling) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php
**Corequisite:** MTH 165.

**MTH 097 Basic Technical Mathematics (3-0) 3 crs.**
Reviews arithmetic, introduces basic algebraic and right triangle trigonometric techniques. Includes arithmetic, elementary algebra, geometry, ratio and proportions, measurements, right triangle trigonometry and their application to solve a variety of career and technical problems. Draws practical problems the student's career area, including emergency services, graphic communications, building trades, culinary arts and information technology. Intended for students pursuing Harper degrees and certificates in career program fields. This course: is not transferable, does not satisfy the prerequisite for any other mathematics course, and does not satisfy any general education requirements.

**MTH 101 Quantitative Literacy (4-0) 4 crs.**
Develops conceptual understanding, problem-solving, decision-making and analytic skills dealing with quantities and their magnitudes and interrelationships, using calculators and personal computers as tools. Includes: computing statistical measures such as central tendency and dispersion; computing correlation coefficients and regression equations; using normal distributions to test hypotheses; using logical statements and arguments in a real-world context; solving systems of equations and inequalities and modeling data; solving mathematical finance problems; and selecting and using appropriate approaches and tools in formulating and solving real-world problems. IAI M1 901
**Prerequisite:** Placement into college-level mathematics. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 103 College Algebra (3-1) 3 crs.**
Emphasizes algebraic and graphical approaches. Topics include but are not limited to polynomial functions, rational functions, exponential functions, logarithmic functions and systems of equations. NOTE: This course does not fulfill the math requirement for the AA or AS degrees.
**Prerequisite:** MTH 070 (Plane Geometry) with a grade of C or better or Geometry Waiver AND placement into college level mathematics. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 124 Finite Mathematics (3-0) 3 crs.**
Develops the mathematics of simple models in behavioral, social and management sciences. Studies applications of set theory, vectors and matrices, linear programming, probability rules, and Markov chains with computer assistance. IAI M1 906
**Prerequisite:** MTH 103 (College Algebra) with a grade of C or better or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 130 Mathematics for Elementary Teaching I (3-2) 4 crs.**
Focuses on mathematical reasoning and problem solving and is designed to meet the requirements of the state certification of elementary teachers when taken in conjunction with MTH 131. The course examines the underlying conceptual framework of the topics of sets, functions, whole numbers, number theory, integers, rational numbers, irrational numbers and the real number system. Students are expected to be active participants in the learning process. They will apply mathematical reasoning in a variety of problem-solving situations using estimation, models, tables, graphs and symbolic representations. The use of appropriate techniques and tools, such as calculators and computers, are a focus of investigations and discussion throughout the course. A weekly lab component is required.
**Prerequisite:** MTH 070 (Plane Geometry) and a college-level math course (101 or higher) with grades of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 131 Mathematics for Elementary Teaching II (3-2) 4 crs.**
Completes the two course sequence that begins with MTH 130 and focuses on mathematical reasoning and the solving of real-life problems, rather than on routine skills. The following topics will be studied in depth: geometry, counting techniques and probability, logic and statistics. Students are expected to be active participants in the learning process. Calculators and computers will be used throughout the course. A weekly lab component is required. IAI M1 903
**Prerequisite:** MTH 130 (Mathematics for Elementary Teaching I) with a grade of C or better.

**MTH 134 Calculus for Business and Social Sciences (4-0) 4 crs.**
Designed specifically for students in business and the social sciences and does not count toward a major or minor in mathematics. It emphasizes applications of the basic concepts of calculus rather than proofs. Topics include limits; techniques of differentiation applied to polynomial, rational, exponential, and logarithmic functions; partial derivatives and applications; maxima and minima of functions; and elementary techniques of integration including substitution and integration by parts. Business and social science applications are stressed throughout the course. IAI M1 900-B
**Prerequisite:** MTH 103 (College Algebra) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 140 Precalculus (5-0) 5 crs.**
Builds on MTH 103 (College Algebra) to provide the foundation for calculus and analytic geometry. Topics include but are not limited to radical and rational equations; equations quadratic in form; polynomial and rational functions; polynomial and rational inequalities; sequences and series; mathematical induction; the binomial theorem; trigonometric functions; inverse trigonometric functions; applications of trigonometric functions; polar coordinates and vectors; and the complex plane.
**Prerequisite:** MTH 103 (College Algebra) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 165 Elementary Statistics (4-0) 4 crs.**
Focuses on statistical reasoning and the solving of problems using real-world data rather than on computational skills. The use of technology-based computations (more advanced than a basic scientific calculator, such as graphing calculators with a statistical package, spreadsheets, or statistical computing software) is required with an emphasis on interpretation and evaluation of statistical results. Topics must include data collection processes (observational studies, experimental design, sampling techniques, bias), descriptive methods using quantitative and qualitative data, bivariate data, correlation, and least squares regression, basic probability theory, probability distributions (normal distributions and normal curve, binomial distribution), confidence intervals and hypothesis tests using p-values. (Credit will be given for either MTH 162 or MTH 165 or MTH 225, but not for more than one of these courses.) IAI M1 902
**Prerequisite:** Placement into college-level mathematics without support. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 200 Calculus I (5-0) 5 crs.**
Studies limits, continuity, derivatives, antiderivatives, and definite integrals as they relate to algebraic, trigonometric, inverse trigonometric, logarithmic and exponential functions. Includes applications to geometry, science, and engineering. IAI M1 900-1, IAI MTH 901
**Prerequisite:** MTH 140 (Precalculus) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 201 Calculus II (5-0) 5 crs.**
Continues MTH 200. Uses integrals to describe area and volume, studies techniques of integration, series, conics, polar coordinates and parametric equations with applications to science and engineering. IAI M1 900-2, IAI MTH 902
**Prerequisite:** MTH 200 (Calculus I) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 202 Calculus III (5-0) 5 crs.**
Continues MTH 201. Studies three-dimensional vectors, solid analytic geometry, vector-valued functions, partial derivatives, multiple integrals, Green's theorem, surface integrals, divergence theorem and Stokes' theorem. IAI M1 900-3, IAI MTH 903
**Prerequisite:** MTH 201 (Calculus II) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 203 Linear Algebra (4-0) 4 crs.**
**This course is only offered in the spring term.**
Introduces matrices, vector spaces and linear transformations. Serves as a first exposure to abstract mathematical structures. Include matrices and their operations, determinants, solutions of systems of linear equations, Euclidean and general vector spaces, bases and dimension, linear transformations and their associated subspaces, eigenvalues and eigenvectors. Discusses applications to mathematics, computer graphics, and physical sciences. IAI MTH 911
**Prerequisite:** MTH 201 (Calculus II) with a grade of C or better.

**MTH 212 Differential Equations (3-0) 3 crs.**
Continues MTH 202. Emphasizes solutions of first order differential equations, linear differential equations, special second order equations and series solutions. Studies selections from these topics: LaPlace transforms, Fourier series, numerical methods and applications of matrix algebra. IAI MTH 912
**Prerequisite:** MTH 202 (Calculus III, IAI M1 900-3, IAI MTH 903) with a grade of C or better.

**MTH 220 Discrete Mathematics (3-0) 3 crs.**
Introduces analysis of finite collections and mathematical foundations of sequential machines, computer system design, data structures and algorithms. Includes sets and logic, sequences and subscripts, number systems, counting, recursion, graph theory, trees, finite probability, matrices and Boolean algebra. IAI M1 905, IAI CS 915
**Prerequisite:** MTH 103 (College Algebra) with a grade of C or better, or other placement options. https://www.harpercollege.edu/testing/mathplacement.php

**MTH 225 Business Statistics (4-0) 4 crs.**
Focuses on the use of statistical concepts as decision-making tools with an emphasis on business-related applications. Topics include descriptive statistics, probability theory, and inferential methods including chi-square tests, regression analysis, and ANOVA. This course is strongly recommended for business majors. You may not receive credit for more than one of MTH 225 OR MTH 165 OR MTH 162 OR MGT 225. (IAI M1 902/IAI BUS 901)
**Prerequisite:** MTH 103 (College Algebra) with a grade of C or better, or other placement options (including meeting the Geometry requirement). https://www.harpercollege.edu/testing/mathplacement.php