

## Department of Mathematical Sciences

### Mathematics and Computer Science Course Descriptions

#### MTH Mathematics

**MTH 051 Arithmetic of Whole Numbers (1-0)** 1 hr.

Covers reading and writing whole numbers and whole number operations. In addition to the four basic processes of addition, subtraction, multiplication, and division, estimation is introduced as an aid to better computation. Course material will be individualized. Carries no transfer credit. Prerequisite: Math placement test.

**MTH 052 Arithmetic of Fractions and Decimals (1-0)** 1 hr.

Covers the operations associated with addition, subtraction, multiplication, and division of common fractions, mixed numbers and decimals. Includes work with word problem applications. Course material will be individualized. Carries no transfer credit. Prerequisite: MTH 051 with a grade of C or better, or math placement test.

**MTH 053 Arithmetic of Ratio, Proportion Percent and Measurement (1-0)** 1 hr.

Covers operations of ratio and proportion, percent, English measurement, metric measurement and geometric measurement. Course material will be individualized. Carries no transfer credit. Prerequisite: MTH 052 with a grade of C or better, or math placement test.

**MTH 055 Basic Mathematics (3-0)** 3 hrs.

Covers the arithmetic of whole numbers, fractions, decimals, ratio, proportion, percent and measurement. Includes work in estimation and word problem applications. The class includes MTH 051, MTH 052, MTH 053 and is offered as a lecture course. Carries no transfer credit. A calculator is allowed. Prerequisite: Math placement test.

**MTH 060 Foundations of Mathematics I (4-0)** 4 hrs.

Introduces basic concepts of algebra including real numbers, variables and algebraic expressions, equations, inequalities, ratios and proportions, Cartesian coordinate system and graphs of relations. Emphasizes mathematical reasoning and problem solving utilizing multiple approaches (algebraic, geometric, and numeric techniques) with focus on mathematical definitions, theorems, symbols, and notation. Carries no transfer credit. Prerequisite: MTH 053 or MTH 055 with a grade of C or better, or math placement test.

**MTH 070 Plane Geometry (3-0)** 3 hrs.

Introduces concepts of Euclidean plane geometry, including lines, angles, polygons and circles. Carries no transfer credit (Formerly MTH 096). Prerequisite: MTH 060 or MTH 063 with grade of C or better or math placement test.

**MTH 080 Foundations of Mathematics II (4-0)** 4 hrs.

Continues MTH 060 and introduces fundamental concepts of algebra including rational expressions, complex numbers, and functions that are polynomial, rational, exponential or logarithmic. Emphasizes mathematical reasoning and problem solving utilizing multiple approaches (algebraic, geometric, and numeric techniques) with focus on mathematical definitions, theorems, symbols, and notation. Adheres to the Department of Mathematical Sciences Core Values. Credits earned in this course cannot be applied toward an Associate in Arts or Associate in Science degree. Carries no transfer credit. Prerequisite: MTH 060 or MTH 063 with a grade of C or better, or math placement test.

**MTH 101 Quantitative Literacy (4-0)** 4 hrs.

Focuses on the analysis and solution of problems. Includes representing and analyzing data using statistical measures, using logical reasoning in a real-world context, estimating, approximating, and judging the reasonableness of answers, and the use of appropriate approaches and tools, such as calculators and computers, in formulating and solving real-world problems. Prerequisite: MTH 070 (or equivalent) and MTH 080 (or MTH 087 in lieu of MTH 080) with grades of C or better, or placement test. IAI M1 901

**MTH 103 College Algebra (3-0)** 3 hrs.

Emphasizes algebraic and graphical approaches to college algebra. Topics include but are not limited to: polynomial, rational, exponential, and logarithmic functions; systems of equations and inequalities; matrices; sequences and series; mathematical modeling. Prerequisite: MTH 070 or equivalent with a grade of C or better or Geometry placement test and MTH 080 with a grade of C or better or placement test. An ACT Math score of 23 or more will satisfy all the previous prerequisites mentioned for this course.

**MTH 104 Plane Trigonometry (3-0)** 3 hrs.

Develops trigonometric functions and relations, solutions of triangles, complex numbers, identities, equations and applications. Prerequisite: Math 103 (4 hours) with grade of C or better or placement test.

**MTH 124 Finite Mathematics (3-0)** 3 hrs.

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. Prerequisite: MTH 103 with a grade of C or better or placement test. IAI M1 906

**MTH 130 Mathematics for Elementary Teaching (3-2)** 4 hrs.

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 for 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 and MTH 080 (or MTH 087 in lieu of MTH 080) with grades of C or better, or placement test.

**MTH 131 Mathematics for Elementary Teaching II (3-2)** 4 hrs.

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. Prerequisite: MTH 130 with a grade of C or better. IAI M1 903

**MTH 134 Calculus for Social Scientists (4-0)** 4 hrs.

Develops an intuitive approach to concepts of differential and integral calculus. Applies these concepts to problems in social, behavioral and management sciences. Not for physical science or mathematics majors. Prerequisite: MTH 103 with a grade of C or better or placement test. IAI M1 900

**MTH 140 Precalculus (5-0)** 5 hrs.

Builds on MTH 103 to provide the foundation in algebra and trigonometry required for success in calculus and analytic geometry. Topics include but are not limited to: polynomial and rational functions and inequalities; analytic geometry; trigonometric functions; analytic geometry; inverse functions; applications of trigonometric functions; polar coordinates and vectors; the complex plane and relationships among exponential, logarithmic, and trigonometric functions. Prerequisite: MTH 070 (or equivalent) with a grade of C or better or Geometry placement test and MTH 103 with a grade of C or better or placement test. An ACT Math score of 28 or more will satisfy all the previous prerequisites mentioned for this course.

**MTH 165 Elementary Statistics (4-0)** 4 hrs.

Focuses on mathematical reasoning and the solving of real-life problems in statistics, rather than on routine skills. Includes analysis of data using sample statistics, basic probability theory, probability distributions (normal and binomial), sampling distributions of means and proportions, statistical inference (estimation, hypothesis testing, t-test and chi-square test and errors), correlation and regression, F-test and analysis of variance. Computer labs using statistical software packages are incorporated throughout course. Credit will not be granted for both MGT 225 and MTH 165. Prerequisite: MTH 080 or MTH 086 and MTH 087 with grades of C or better, or consent of instructor. IAI M1 902

**MTH 200 Calculus with Analytic Geometry I (5-0)** 5 hrs.

Studies vectors, limits, the derivative and the definite integral with applications to geometry, science and engineering. Prerequisite: MTH 103 and MTH 104 with grades of C or better or MTH 140 with a grade of C or better or placement test. IAI M1 900 IAI EGR 901

**MTH 201 Calculus with Analytic Geometry II (5-0)** 5 hrs.

Continues MTH 200. Studies differentiation of transcendental functions, techniques of integration, series, conics, polar coordinates and parametric equations with applications to science and engineering. Prerequisite: MTH 200 with a grade of C or better. IAI EGR 902

**MTH 202 Calculus with Analytic Geometry III (4-0)** 4 hrs.

Continues MTH 201. Studies vector functions, multivariable functions, differentials, multiple integration and vector calculus with applications to science and engineering. Prerequisite: MTH 201 with a grade of C or better. IAI EGR 903

**MTH 203 Linear Algebra (3-0)** 3 hrs.

Introduces vector spaces, linear dependence, bases and transformations using systems of linear equations, matrices and determinants. Studies geometric, physical and business applications. Prerequisite: MTH 134 or MTH 200, or concurrent enrollment, or consent of instructor.

**MTH 212 Differential Equations (3-0)** 3 hrs.

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. Prerequisite: MTH 202 with a grade of C or better. IAI EGR 904

**MTH 220 Discrete Mathematics (3-0)** 3 hrs.

Introduces analysis of finite collections and mathematical foundations of sequential machines, computer system design, data structures and algorithms. Includes sets and logic, subscripts, arrays, number systems, counting, recursion, graph theory, trees, networks and Boolean algebra. Prerequisite: MTH 103 with a grade of C or better, or placement test. IAI M1 905

**MTH 265 Mathematical Statistics (3-0)** 3 hrs.

Includes the study of probability spaces, random variables and distributions, laws of large numbers and central limit theorem, joint probability distributions, sampling distributions, theory of estimation, simple linear regression and introduction to SPSS. Prerequisite: MTH 202 with a grade of C or better.

#### CSC Computer Science

**CSC 121 Computer Science I (3-2)** 4 hrs.

Introduces a disciplined approach to problem solving and algorithm development. Introduces procedural approach; data abstraction; selection, repetition and sequence control structures; arrays, records and files; and an introduction to recursion. Emphasizes program design, testing and documentation using good programming style in a block-structured, high-level programming language. Designed as the first of a sequence of courses (CSC 121, CSC 122, CSC 216 and CSC 217) for students majoring in Computer Science.

Prerequisite: MTH 103 and MTH 104 with grades of C or better or MTH 140 with a grade of C or better or consent of instructor. IAI CS 911

**CSC 122 Computer Science II (3-2)** 4 hrs.

Introduces the design and implementation of large scale problems. Introduces data structures: files, sets, pointers, lists, stacks, queues, trees and graphs. Introduces program verification and complexity. Builds previous knowledge of recursion, text processing, and searching and sorting algorithms. Designed as the second of a sequence of courses (CSC 121, CSC 122, CSC 216, CSC 217) for students majoring in Computer Science. Prerequisite: CSC 121 and MTH 200 with grades of C or better or consent of instructor. IAI CS 912

**CSC 208 Problem Solving for Science and Engineering Using FORTRAN (3-2)** 4 hrs.

Emphasizes problems analysis and problem solving. Includes problem formulation, data storage and retrieval techniques, algorithm analysis and development, flow chart or pseudocode construction. Introduces the student to numerical methods and simulations. Develops working knowledge of current version of FORTRAN. Designed to use the computer in the study of problems in engineering, mathematics and/or physical sciences. Intended for the mathematics, science, computer science or engineering student. Prerequisite: MTH 200 with a grade of C or better or consent of instructor. IAI EGR 921

**CSC 211 Introduction to C Programming and UNIX (3-2)** 4 hrs.

Develops working knowledge in the use of the computer in the C programming language. Includes problem formulation, data storage and retrieval, algorithms, flowcharts or pseudocode, numerical analysis and structured programming, lexical analysis and string manipulation. Introduces student to a UNIX-like operating system environment. Intended for the computer science or engineering student. Prerequisite: CSC 121 or CSC 208 with a grade of C or better or consent of instructor.

**CSC 214 Introduction to Java Programming (3-2)** 4 hrs.

Introduces the Java language in a UNIX environment. Topics including: algorithms, problem formulation, structured programming, variables, data types, input/output repetition, selection, arrays, functions, classes/objects, and recursion. Applications emphasize math, science, engineering, and computer science. This course will build on topics covered in CSC 121 (only in a new language). Prerequisite: CSC 121 with a grade of C or better or consent of instructor.

**CSC 216 Data Structures and Algorithm Analysis (2-2)** 3 hrs.

Provides exposure to techniques for storing and manipulating data. Includes discussion of addition, deletion and insertion algorithms for stacks, queues, deques, linked lists and trees. Emphasizes algorithm analysis as it builds on topics from previous course, CSC 122. Designed as the third of a sequence of courses (CSC 121, CSC 122, CSC 216 and CSC 217). Prerequisite: CSC 122 with a grade of C or better or consent of instructor. IAI CS 921

**CSC 217 Assembler Programming and Machine Organization (3-2)** 4 hrs.

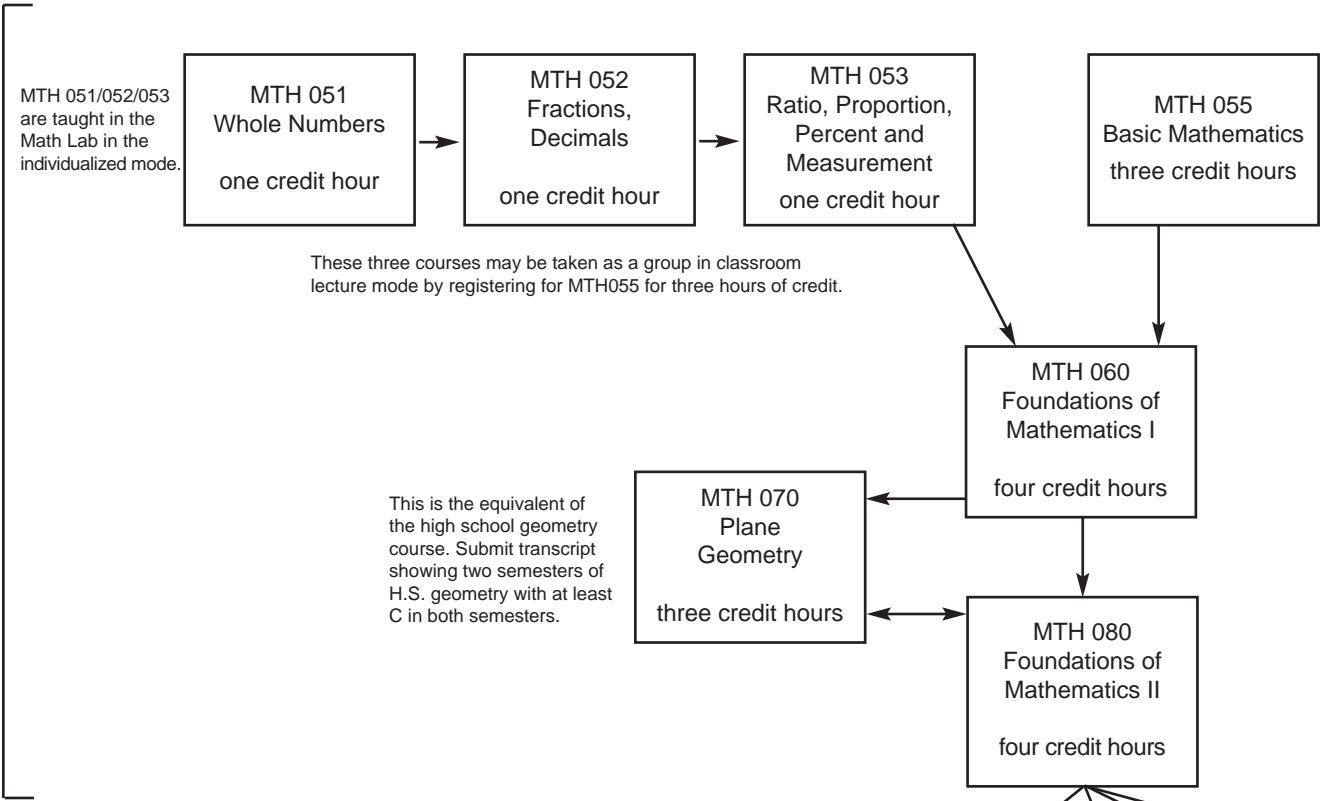
Emphasizes machine-level programming, instruction sets, data representation, subroutines, I/O hardware and software, linking and loading related to higher level languages. Designed as the fourth in a sequence of courses (CSC 121, CSC 122, CSC 216 and CSC 217) for students majoring in Computer Science. Prerequisite: CSC 216 with a grade of C or better or consent of instructor. IAI CS 922

# Mathematics and Computer Science Courses and Prerequisites

**TM/PS Division Office—**  
 Building H, Room H119  
 847.925.6374  
**Math Faculty Offices—**  
 Building D, Second Floor West

All first-time Harper math students must take a math assessment test before registering for their first math course or place using ACT math score.  
  
 The Testing Office is located in the Building A, Room A148.

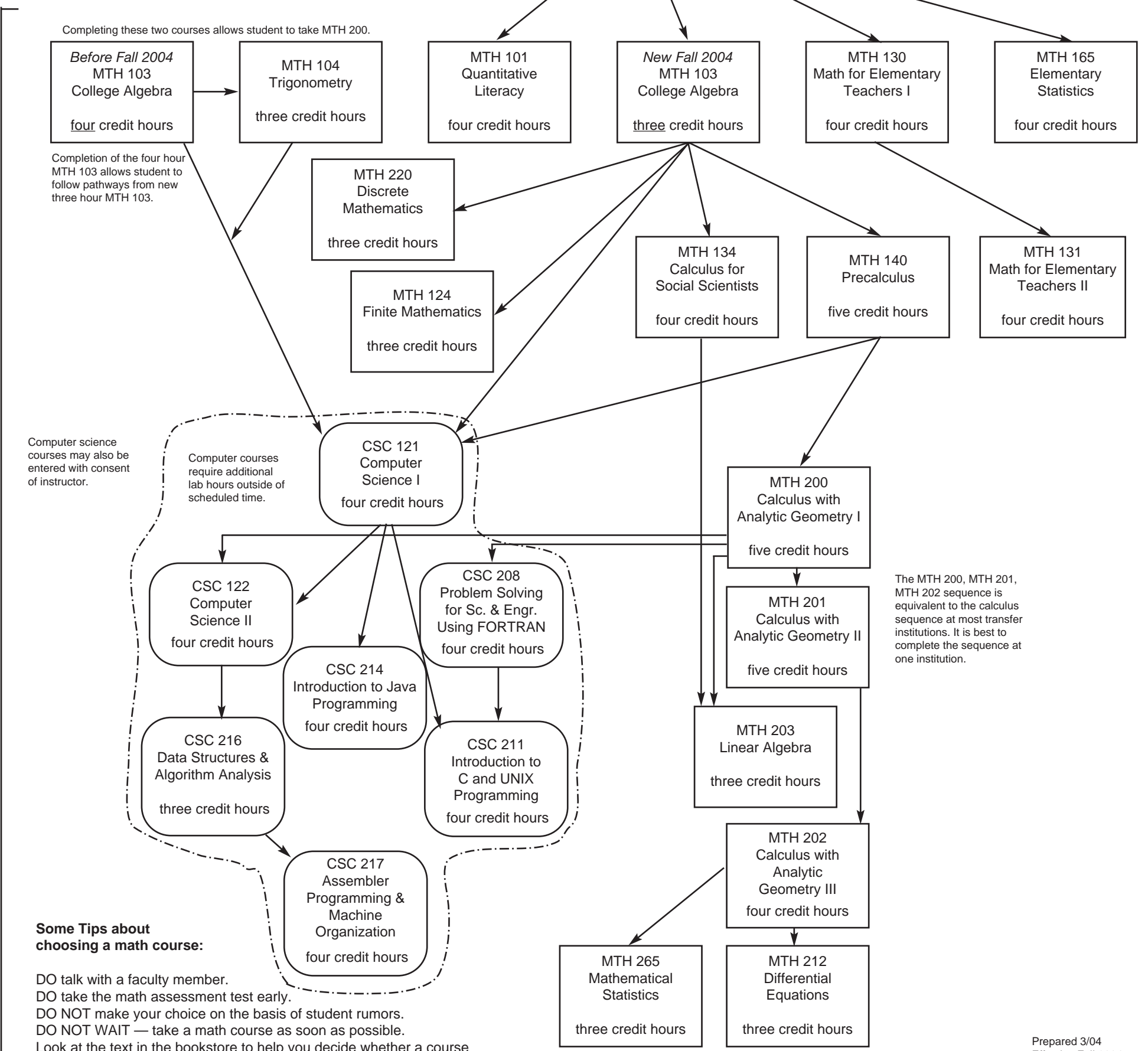
Developmental/Remedial Courses



One's success in math depends on many factors. Degree requirements vary by program and transfer institution. Discuss your program with a student development faculty member before enrolling.

↓ Arrows indicate prerequisites.

College Credit Courses



The MTH 200, MTH 201, MTH 202 sequence is equivalent to the calculus sequence at most transfer institutions. It is best to complete the sequence at one institution.

**Some Tips about choosing a math course:**

- DO talk with a faculty member.
- DO take the math assessment test early.
- DO NOT make your choice on the basis of student rumors.
- DO NOT WAIT — take a math course as soon as possible.
- Look at the text in the bookstore to help you decide whether a course you are considering is too difficult or too easy for your background.