

Liberal Arts Student with Minimal Mathematics Background

The following courses are credit-level math courses with minimal prerequisites: MAT 100, MAT 101, MAT 102, and MAT 109. In addition, MAT 118 may be of interest to students with stronger Algebra backgrounds. These courses are independent of each other and can be taken in any combination or any order. Students should consider the descriptions below carefully to decide which course(s) is most appropriate for them. The descriptions are meant as a supplement to the official college catalog descriptions, to better assist students in selecting a course. Students should also refer to the college catalog for official course descriptions. Note: MAT 114 is ONLY for students who are officially in the elementary education program. Liberal Arts students can not register for MAT 114.

MAT 100: Topics in Mathematics

This course includes a variety of different mathematical topics and their applications. You may see a selection of the following topics, there are others:

- Problem solving (general “plan of attack” for any problem)
- Geometry- the mathematics of intricate fractal designs and/ or global positioning
- Consumer mathematics-credit card debt, mortgages and savings plans
- Optimization- making the best decisions based on mathematical calculations
- Graph theory- planning delivery/ street cleaning routes and/ or DNA and RNA sequencing
- Number systems- how the ancient Egyptians wrote numbers
- Social choice- the mathematics and fairness of election systems
- Apportionment and Fair Division- How to distribute things fairly
- Decision making- how to schedule multiple tasks most efficiently.
- Probability- calculating odds, as well as permutations and combinations

MAT 101 Concepts of Mathematics

This is a logic course, so it may seem very different from other math courses. This course looks at the language of arguments and proofs, rather than focusing on numbers and calculations. Students will

- Look at the meaning of “and,” “or,” “not,” and “if then” statements
- Use written information to see when they can draw valid conclusions
- Learn logical equivalences and how to apply them.

Other possible topics include:

- How logic relates to simple electronic circuits and devices
- Strategies for simple games (like tic-tac-toe)
- Basic Decision Theory
- Truth Tables
- Set Theory- classification and categorization of objects

This course may be of particular interest to students interested in English, philosophy or law.

MAT 102 Introduction to Statistics

All around us in newspapers, television, magazines and on the Internet, we see graphs and figures that are presented to us as facts, such as comparisons of product performance. It is useful to know how this information is gathered and organized, and to determine whether these claims seem accurate or misleading. For this reason introductory statistics is an important course for achieving success in many professional careers as well as becoming an informed citizen. For those who seek a career in business, many course concepts will help them understand customer relations and survey response data. Future educators will see the evaluation methods (means, medians, percentiles, etc) used for student rankings. For those entering the health professions, the course will introduce the tools used in interpreting medical and scientific studies (hypothesis testing, correlation, estimation, etc.)

Statistics involves the collection, organization and interpretation of data. This means organizing information in charts and graphs, as well as calculating various significant values including mean, median, mode and standard deviation. Students will need to use formulas and graphing calculators to perform calculations and solve applications.

This course may be of particular interest to students focusing on business, psychology, sociology, education, nursing, and some sciences.

MAT 109 Algebra and Trigonometry

This course is intended to prepare students for MAT 111 (pre-Calculus) and MAT 122 (Calculus). It further develops the Algebra from MAT 002 (Introductory Algebra). This course is NOT recommended for most students. Students should only register for MAT 109 under the following conditions: a) They have a HIGH score (at least 85) on the Algebra placement test or the MAT 002 exit exam AND b) They NEED to take MAT 111, MAT 118, MAT 122, and /or MAT 123 for their major, but don't yet fulfill the prerequisite. A MAT 109 pretest is available to determine student's preparedness for this course.

MAT 118 Finite Mathematics

MAT 118 ties a variety of interconnected math topics with applications to Business, Social Science and other fields. Topics include probability, linear programming, game theory (gambling/ competing businesses), matrix operations and Markov Chains. A wide variety of technology (Graphing calculators, Derive, and other computer software) is integrated into this course.

A strong background in Intermediate Algebra or MAT 109 is highly recommended to succeed in this course. This includes graphing linear equations and solving equations. This course may be of particular interest to students focusing on business or mathematics.

Liberal Arts Student with Good Mathematics Background

Although liberal arts students with a strong mathematical background should find it useful to take one of the previous courses [MAT 100, 101, 102, 118], other courses, of a higher level, may be more valuable, especially if they enter fields that use higher mathematics. This is true for certain areas of economics and finance, sociology, science and psychology. In all cases, students should consult with their advisors. Possible higher level courses include MAT 103, MAT 111, MAT 122, MAT 123 and beyond. Students should carefully check prerequisites before enrolling. MAT 103 has MAT 102 as a prerequisite. Information on Calculus-sequence classes is below.

The Calculus Sequence

Calculus I and Calculus II (MAT 122 and MAT 123) are required for some majors such as computer science, pre-med, engineering, mathematics, and the sciences. In order to take these demanding courses, students need a deep understanding of advanced algebra, as well as different types of functions. Students lacking strong high school mathematics backgrounds may need to take prerequisite courses such as MAT 109 (Algebra and Trigonometry) and MAT 111 (Elementary Functions/ Pre-calculus) before registering for Calculus courses. These courses build on each other in sequence MAT 109-MAT111-MAT122-MAT 123. **Students who had to take any remedial math courses must begin the sequence at MAT 109 if they plan to take MAT 111, 122, or 123.**

MAT 109 Prerequisite Knowledge

If you plan to take MAT 109, then you will be expected to have a strong foundation in basic algebra. Below is some notation/ formulas your instructor will expect you to be familiar with BEFORE you enter the course. If you do not understand some of the notation, then you are likely to struggle with MAT 109. If you do not plan to ever take calculus, then you should consider taking a course for liberal arts students. If you need to take MAT 109 for your major, or as a prerequisite for Calculus, then you should brush up your algebra skills before taking this course. The website www.mymathtest.com can give you a diagnostic algebra test and tell you what topics you need to review in an algebra text.

- $-8^0 + 3^{-1} = -\frac{2}{3}$
- $(2x - 4)(3x + 5) = 6x^2 - 2x - 20$
- If $2\pi r = c$, then $r = \frac{c}{2\pi}$
- The solution of $\frac{14}{6x} = \frac{3}{2}$ is $x = \frac{14}{9}$
- $25x^2 - 36y^2$ factors into $(5x + 6y)(5x - 6y)$
- $\frac{12x^7y^8}{4x^5y^9} = \frac{3x^2}{y}$

MAT 111 Prerequisite Knowledge

If you plan to take MAT 111, then you will be expected to have a strong foundation in intermediate algebra, with some knowledge of functions and graphing. Below is some notation/ formulas your instructor will expect you to be familiar with BEFORE you enter the course. If you do not understand some of the notation, then you are likely to struggle with MAT 111. If this material looks familiar, but you haven't seen it for a while, then you should review these concepts to prepare yourself for the course. If this material is unfamiliar to you, then you should take MAT 109 before registering for MAT 111.

- $\frac{5}{x} - \frac{3}{x-2} = \frac{2x-10}{x^2-2x}$
- The slope of a line from the origin to (2,-6) is -3
- $\frac{\sqrt{x} \cdot x^2}{x^4} = x^{-3/2}$
- $\sin 60^\circ = \frac{\sqrt{3}}{2}$
- $3x^2 - 5x + 1 = 0$ has a solution at $x = \frac{5 \pm \sqrt{13}}{6}$
- If $5 = ax + xy$ then $x = \frac{5}{a+y}$

MAT 122 Prerequisite Knowledge

If you plan to take MAT 122, then you will be expected to have a strong foundation in Elementary Functions. If this material looks familiar, but you haven't seen it for a while, then you should review these concepts to prepare yourself for the course. If this material is unfamiliar to you, then you should take MAT 111 and possibly MAT 109 before registering for MAT 122.

- $\tan(\arctan x) = x$
- $\ln 5 + \ln 2 = \ln 10$
- $\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$
- $f(x) = \frac{x-5}{x-2}$ has a vertical asymptote at $x = 2$, a horizontal asymptote at $y = 1$, and a zero at $x = 5$
- $y = (x-1)^2 + 5$ is a parabola with vertex at (1,5)
- The average rate of change of $f(x) = x^2$ on [1,2] is 3