

# Mathematics

## Mathematics Degrees and Certificates

### Mathematics, Associate in Science

This degree is designed for students who wish to major in mathematics and plan to transfer to four-year institutions. It is appropriate for students interested in engineering, physics or other physical sciences. Electives should be selected based on the student's interest and the requirements of the transfer institution or technician-level vocation opportunities.

For information, contact area coordinator, Michele Leacott, at (609)343-5044 or [mleacott@atlantic.edu](mailto:mleacott@atlantic.edu).

### Upon completion of this program students will be able to:

- Differentiate and integrate algebraic and transcendental functions. (This includes partial differentiation and double/triple integrals.);
- Solve first order differential equation and second order differential equations;
- Apply the concept of a limit to appropriate mathematical constructs;
- Analyze and solve mathematical problems objectively;
- Transfer to four-year institution to a mathematics program;
- Use inductive and deductive reasoning skills needed for theoretical and applied mathematics;

(MATM-Fall 2022)

Program: [Mathematics](#)

## General Education Courses

When a course is not specified, refer to the list of approved General Education courses.

## Communication

Course #	Title	Credits:
ENGL101	Composition I	3
ENGL102	Composition II	3
COMM120	Public Speaking	3

## Mathematics-Science-Technology

Course #	Title	Credits:
MATH155	Calculus I	4
MATH156	Calculus II	4
PHYS225	General Physics I	4

## Social Science

Course #	Title	Credits:
	General Education Social Science Course (3 credits)	3

## Humanities

Course #	Title	Credits:
	Choose: ARTS103, ARTS108, ARTS109, ARTS115, DANC170, MUSC100 or THEA110 (3 credits)	3
	General Education Humanities Course (3 credits)	3

## Program Requirements

Course #	Title	Credits:
MATH152	Linear Algebra	4
MATH153	Discrete Mathematics	4
MATH255	Calculus III	4
MATH256	Differential Equations	4
PHYS226	General Physics II	4
	Choose: CISM135-Computer Programming C++ or CISM154-Computer Programming-Java (4 credits)	4

## Program Electives

Course #	Title	Credits:
	Choose a minimum of 6 credits from the following: CHEM110, CHEM111, CISM159, ECON110, ECON210, or Liberal Arts Elective	6

## Technological Competency: 0-4 Credits

(Is fulfilled with CISM125, CISM132, testing or reviewed departmental portfolio.)

## Recommended sequence of courses:

### First Semester

Course #	Title	Credits:
ENGL101	Composition I	3
MATH153	Discrete Mathematics	4
MATH155	Calculus I	4
	Choose: CISM135-Computer Programming C++ or CISM154-Computer Programming-Java (4 credits)	4

## Second Semester

<b>Course #</b>	<b>Title</b>	<b>Credits:</b>
ENGL102	Composition II	3
MATH152	Linear Algebra	4
MATH156	Calculus II	4
COMM120	Public Speaking	3
	General Education Social Science Course (3 credits)	3

## Third Semester

<b>Course #</b>	<b>Title</b>	<b>Credits:</b>
MATH255	Calculus III	4
PHYS225	General Physics I	4
	General Education Humanities Course (3 credits)	3
	Program Elective Course (3 credits)	3

## Fourth Semester

<b>Course #</b>	<b>Title</b>	<b>Credits:</b>
MATH256	Differential Equations	4
PHYS226	General Physics II	4
	Choose: ARTS103, ARTS108, ARTS109, ARTS115, DANC170, MUSC100 or THEA110 (3 credits)	3
	Program Elective Course (3 credits)	3
	<b>Total credits:</b>	<b>60</b>

# Mathematics Classes

## MATH073: Introduction to Algebra I—Prealgebra

First of two courses designed for students who need remediation in some areas of arithmetic and beginning algebra as demonstrated by the results of the Placement Test. Concentration is on developing reasoning and problem-solving skills while emphasizing powers and roots of whole numbers, significant digits, order of operations, integers, fractions, first degree linear equations, percents and their applications, polynomials and an introduction to SI units, ratio, proportion and factor analysis. Does not meet General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

Placement Test score

**Program:** [Mathematics](#)

## MATH074: Introduction to Algebra II

Second of two courses designed for students who need remediation in some areas of arithmetic and beginning algebra as demonstrated by their results on the Placement Test. Concentration is on developing reasoning and problem skills. Major topics include exponents, factoring of polynomials, graphing, rational expressions, systems of equations in two variables, radicals and quadratic equations and their applications. Does not meet General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH073 with a grade of C or better or Placement Test score

**Program:** [Mathematics](#)

## MATH099: Accelerated Elementary Algebra

This course is a self-paced course designed for students to work at their own pace with supplemental instruction and group lectures. This course is designed for students who need remediation in some areas of arithmetic and beginning algebra as demonstrated by placement test score. The concentration is on developing reasoning and problem-solving skills while emphasizing: powers, significant digits, order of operations, integers, fractions, first degree linear equations, percents and their applications, polynomials, ratio, proportion, exponents, factoring of polynomials, graphing, rational expressions, radicals, and quadratic equations and their applications. Completion is equivalent to completing both MATH073 and MATH074. Does not meet General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

Placement Test score

**Program:** [Mathematics](#)

## MATH121: Applications of Mathematics

One-semester course that is intended for students who are not mathematics or science majors. Concepts are introduced through examples with a strong emphasis on practical applications. Topics of study include critical thinking skills, sets, logic, systems of numeration, geometry, mathematical systems, consumer mathematics, probability, statistics, and graph theory. Students will be required to work with a calculator and a computer software program. Meets General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH073 or MATH099 with a grade of C or better or Placement Test score or SAT score (ESLN092 and ESLN100 may be taken concurrently with permission of instructor).

**Program:** [Mathematics](#)

## MATH122: College Algebra

Includes properties of real numbers, equations, inequalities, linear functions, polynomial and rational functions, exponential and logarithmic functions, inverse functions, analyzing graphs of functions, systems of equations and complex numbers. Meets General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH074 or MATH099 with a grade of C or better or Placement Test score or SAT score (ESLN092 and ESLN100 may be taken concurrently with permission of instructor).

**Program:** [Mathematics](#)

## MATH150: Precalculus

Includes equations and inequalities, relations, linear functions, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, inverse trigonometric functions, trigonometric identities and equations, applications of trigonometry, systems of equations and complex numbers. Students will be required to work with a graphing calculator and a mathematical software program. Meets General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH074 or MATH099 with a grade of C or better or Placement Test score or SAT score. (ESLN092 and ESLN100 may be taken concurrently with permission of instructor).

**Program:** [Mathematics](#)

## MATH152: Linear Algebra

Includes linear equations and matrices, linear dependence and independence, determinants, dimension and basis of a vector space, linear transformations, inner product and cross product, orthogonality, eigenvalues and eigenvectors. Students will be required to work with a graphing calculator and a computer software program. Meets General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH155 with a C or better or Placement Test score or SAT score

**Program:** [Mathematics](#)

## MATH153: Discrete Mathematics

Students study concepts and techniques that are fundamental to mathematics and computer science. Selected topics are explored in depth from areas of set theory, logic, Boolean algebra, number systems, combinatorics, graph theory, complexity of algorithms and data structure and representation.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH122 or MATH150 with a C or better or Placement Test score or SAT score

**Program:** [Mathematics](#)

## MATH155: Calculus I

Topics of study include properties of functions and their graphs, properties and applications of limits, techniques of differentiation, applications of differentiation, techniques of integration, applications of integration, differentiation and

integration of logarithmic and exponential functions, differentiation and integration of trigonometric and inverse trigonometric functions, applied optimization, differentials, and hyperbolic functions. Meets the General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH150 or equivalent with a grade of C or better; or Placement Test score or SAT score

**Program:** [Mathematics](#)

## MATH156: Calculus II

Topics of study include applications of integration, integration techniques, indeterminate forms, improper integrals, sequences, series, conics, parametric equations and polar coordinates. Students will be required to work with a graphing calculator and a mathematical software program. Meets the General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH155 or equivalent with a grade of C or better

**Program:** [Mathematics](#)

## MATH220: Statistical Methods

Includes frequency distributions and graphs, data description, counting techniques, probability, discrete probability distributions, the normal distribution, confidence intervals and sample size, hypothesis testing, analysis of variance, correlation and regression. Students will be required to work with a graphing calculator and a computer software program. Meets General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH073 or MATH099 with a grade of C or better or Placement Test score or SAT score. (ESLN092 and ESLN100 may be taken concurrently with permission of instructor).

**Program:** [Mathematics](#)

## MATH255: Calculus III

Topics of study include vectors in the plane, analytic geometry three-dimensional space, vectors in three-dimensional space, differentiation and integration of vector-valued functions, functions of several variables, Lagrange multipliers, multiple integration, applications of multiple integrals, Jacobians, vector analysis, Green's Theorem, Divergence Theorem, and Stoke's Theorem. Students will be required to work with a graphing calculator and a mathematical software program. Meets the General Education requirement for Mathematics.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH156 or equivalent with a grade of C or better

**Program:** [Mathematics](#)

**Semester Offered:**

Fall

## MATH256: Differential Equations

Topics of study include first and higher order equations, phase portraits and stability, numerical methods, initial-value and boundary value problems. Students will be required to work with a graphing calculator and a computer software program.

**Credits:** 4

**Lecture Hours:** 4

**Lab Hours:** 0

**Prerequisites:**

MATH255 with a grade of C or better

**Program:** [Mathematics](#)

**Semester Offered:**

Spring