

Mathematics

Faculty/Staff

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Aims of the Program

First, we aim to give each student an understanding of basic mathematics and its application to solving problems expressible by algebraic equations and inequalities. Second, we aim to train students to understand the fundamental concepts of mathematics so that they can teach the subject on the elementary or secondary level. Third, we aim to give a solid foundation in the area of mathematics which will prepare students to pursue further studies in mathematics, the physical sciences, economics, and the engineering sciences.

Mathematics Degrees and Certificates

B.A. Mathematics

General Education Requirements for all Bachelor's degrees

BA Foreign Language Requirement

Quality Enhancement Plan (QEP) Requirement

Required Courses

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 181	Calculus I	4
MATH 182	Calculus II	4
MATH 283	Calculus III	4
MATH 211	Logic and Set Theory	3
MATH 321	Differential Equations	3
MATH 361	Introduction to Linear Algebra	3
MATH 431	Abstract Algebra	3
MATH 484	Mathematics Seminar	1
MATH 485	Portfolio	1
	Mathematics Upper Division Electives	3

Required cognate: take one of the following courses:

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 111	Principles of Computer Programming II	3
PHYS 121	General Physics I	4
PHYS 122	General Physics II	4
	Total credits:	35-36

Category Descriptions

Mathematics Upper Division Electives

Credits: 3

Item #	Title	credits
MATH 322	Partial Differential Equations	3
MATH 341	Geometry	3
MATH 371	History of Mathematics	3
MATH 381	Complex Variables	3
MATH 411	Numerical Analysis with Application	3
MATH 441	Calculus-Based Probability Theory	4
MATH 442	Actuarial Exam P Preparation	3
MATH 461	Number Theory	3

B.S. Mathematics

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

Required Courses

Item #	Title	credits
MATH 181	Calculus I	4
MATH 182	Calculus II	4
MATH 283	Calculus III	4
MATH 211	Logic and Set Theory	3
MATH 321	Differential Equations	3
MATH 361	Introduction to Linear Algebra	3
MATH 431	Abstract Algebra	3
MATH 471	Real Analysis	3
MATH 484	Mathematics Seminar	1
MATH 485	Portfolio	1
	Mathematics, BS 12 Hours Upper Division Electives	12

Required cognate: take two of the following courses:

Item #	Title	credits
CSIS 110	Principles of Computer Programming I	3
CSIS 111	Principles of Computer Programming II	3
PHYS 121	General Physics I	4
PHYS 122	General Physics II	4
	Total credits:	47-49

Category Descriptions

Mathematics, BS 12 Hours Upper Division Electives

Credits: 12

Item #	Title	credits
MATH 322	Partial Differential Equations	3
MATH 341	Geometry	3
MATH 371	History of Mathematics	3
MATH 381	Complex Variables	3
MATH 411	Numerical Analysis with Application	3
MATH 441	Calculus-Based Probability Theory	4
MATH 442	Actuarial Exam P Preparation	3
MATH 461	Number Theory	3

B.S. Mathematics Secondary Teaching Area

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

Teaching Certification Program

The following Mathematics major is for teaching certification only. Requirements for certification are listed in the Education section of this *Bulletin*.

You must make formal application for admittance to the Teacher Education Program. Applications are available at the Education Department office.

Content Area + Teaching Certification

Required Courses

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 181	Calculus I	4
MATH 182	Calculus II	4
MATH 283	Calculus III	4
MATH 211	Logic and Set Theory	3
MATH 341	Geometry	3
MATH 361	Introduction to Linear Algebra	3
MATH 431	Abstract Algebra	3
MATH 484	Mathematics Seminar	1
MATH 485	Portfolio	1
	Mathematics Secondary Teaching 6 Hours Upper Division Electives	6
	Total credits:	35

Category Descriptions

Mathematics Secondary Teaching 6 Hours Upper Division Electives

Credits: 6

Item #	Title	credits
MATH 321	Differential Equations	3
MATH 322	Partial Differential Equations	3
MATH 381	Complex Variables	3
MATH 411	Numerical Analysis with Application	3
MATH 441	Calculus-Based Probability Theory	4
MATH 442	Actuarial Exam P Preparation	3
MATH 461	Number Theory	3
MATH 471	Real Analysis	3

Minor in Mathematics

Required Courses

Item #	Title	credits
MATH 181	Calculus I	4
MATH 182	Calculus II	4
MATH 283	Calculus III	4
	Mathematics Minor Upper Division Electives	6
	Total credits:	18

Category Descriptions

Mathematics Minor Upper Division Electives

Credits: 6

Item #	Title	credits
MATH 322	Partial Differential Equations	3
MATH 341	Geometry	3
MATH 371	History of Mathematics	3
MATH 381	Complex Variables	3
MATH 411	Numerical Analysis with Application	3
MATH 441	Calculus-Based Probability Theory	4
MATH 442	Actuarial Exam P Preparation	3
MATH 461	Number Theory	3

Minor in Mathematics - Secondary Certification

Teaching Certification Program

The following mathematics minor is for teaching certification only. Requirements for certification are listed in the Education section of this *Bulletin*.

You must make formal application for admittance to the Teacher Education Program. Applications are available at the Education Department office.

Required Courses

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 181	Calculus I	4
MATH 182	Calculus II	4
MATH 211	Logic and Set Theory	3
MATH 341	Geometry	3
MATH 361	Introduction to Linear Algebra	3

Mathematics 6 Hours Upper Division Electives

Item #	Title	credits
MATH 321	Differential Equations	3
MATH 322	Partial Differential Equations	3
MATH 371	History of Mathematics	3
MATH 381	Complex Variables	3
MATH 411	Numerical Analysis with Application	3
MATH 431	Abstract Algebra	3
MATH 441	Calculus-Based Probability Theory	4
MATH 461	Number Theory	3
MATH 471	Real Analysis	3
	Total credits:	26

Mathematics Classes

MATH 013: Algebra

This course provides the student with a basic understanding of addition, subtraction, multiplication, and division of fractions and rational expressions in addition to an understanding of quadratic equations, inequalities, and graphing.

This course does not apply toward general education or graduation requirements.

Credits: 3

Program: Mathematics

Semester Offered: Fall

Spring

MATH 110: College Algebra

A study of algebraic expressions, equations, inequalities, and functions. Includes function composition, inverse functions, and graphs of functions. Solutions of linear and quadratic functions are presented (including complex numbers) with extension to other polynomial functions. Topics also include properties and graphs of rational functions, and systems of linear equations and their solutions including matrix methods and determinants.

Credits: 3

Prerequisites:

ALEKS Placement Test Score of 46-60 or an SAT mathematics score of at least 530 or an ACT mathematics score of at least 21 or **MATH 013** with a grade of C- or higher or permission of the department.

Program: Mathematics

Semester Offered: Fall

Spring

MATH 115: Mathematics in Society

A quantitative reasoning course designed to develop math literacy by considering common occurrences of mathematics topics encountered through living in today's world. Topics include logical reasoning with sets, interpretation of data, using functional models in real-world applications such as growth and personal finance, basics of probability and statistics with an emphasis on interpreting results, and the design of voting systems by apportionment.

Credits: 3

Prerequisites:

SAT mathematics score of at least 530 or an ACT mathematics score of at least 21 or **MATH 013** with a grade of C- or higher or permission of the department.

Program: Mathematics

MATH 116: Mathematics and Humanity

A survey of general mathematical content with a focus on the human experience of engaging in mathematical thought. The course is taught with a focus on a few select topics which may change from year to year. Topics may include truth and certainty, games and puzzles, the infinite, patterns, art, sculpture, music, and dance.

Credits: 3

Prerequisites:

SAT mathematics score of at least 530 or an ACT mathematics score of at least 21 or **MATH 013** with a grade of C- or higher or permission of the department.

Program: Mathematics

MATH 131: Applied Mathematics

This course covers topics from number concepts and operations, patterns and algebra, geometry and measurement, and probability and statistics with an emphasis on problem solving in the real world. The course covers fundamental aspects of mathematics as required by the Texas Department of Education.

Credits: 3

Prerequisites:

ALEKS Placement Test Score of 46-60 or an SAT mathematics score of at least 530 or an ACT mathematics score of at least 21 or **MATH 013** with a grade of C- or higher or permission of the department.

Program: Mathematics

Semester Offered: Spring

MATH 141: Introduction to Probability and Statistics

An introduction to the statistical processes of sampling, descriptive statistics, presentation of data, and inferential statistics. Included are elements of probability, discrete and continuous random variables, and the probability basis for hypothesis testing. Specific statistical techniques and concepts include use of the normal distribution, the t-distribution, χ^2 distribution, analysis of variance, correlation, and linear regression.

Credits: 3

Prerequisites:

ALEKS Placement Test Score of 46-60 or an SAT mathematics score of at least 530 or an ACT mathematics score of at least 21 or **MATH 013** with a grade of C- or higher or permission of the department.

Program: Mathematics

Semester Offered: Fall

Spring

MATH 180: Precalculus

A review of basic properties of functions including their domain, range, graphs, and relationship to their inverse functions with an emphasis on exponential and logarithmic functions and their applications. An introduction to trigonometry including basic definitions of the trigonometric functions and their properties, identities, and specific trigonometric formulae such as addition and subtraction, double-angle, and half-angle. Applications to triangles are covered utilizing the laws of sines and cosines. Other topics such as polar coordinates and conic sections are presented. This course includes an introduction to sequences, series, limits, and aspects of calculus.

Credits: 4

Prerequisites:

ALEKS Placement Test Score of 61-75, or a high school Algebra II course with a grade of at least a B along with an SAT mathematics score of at least 530 or an ACT mathematics score of at least 21, or **MATH 110** with a grade of C- or higher, or permission of the department.

Program: Mathematics

Semester Offered: Spring

MATH 181: Calculus I

A study of algebraic and transcendental functions of one variable, limits, continuity, differentiation, integration, and applications of derivatives and integrals.

Credits: 4

Prerequisites:

ALEKS Placement Test Score of 76-100 or **MATH 180** with a grade of C- or higher or a high school precalculus with a grade of at least a B and permission of the instructor.

Program: Mathematics

Semester Offered: Fall

MATH 182: Calculus II

A study of the calculus of transcendental functions, introduction to differential equations, applications of integration, techniques of integration, and infinite series.

Credits: 4

Prerequisites:

MATH 181

with a grade of C- or higher

Program: Mathematics

Semester Offered: Spring

MATH 211: Logic and Set Theory

An introduction to mathematical proofs, elementary logic, sets, equivalence relations, and functions. The emphasis is on understanding and writing of proofs.

Credits: 3

Prerequisites:

MATH 182

with a grade of C- or higher

Program: Mathematics

Semester Offered: Fall

MATH 283: Calculus III

A study of vectors in two and three dimensions, motion in space, polar, cylindrical and spherical coordinate systems, functions of several variables, partial derivatives, multiple integrals, and differentiation and integration in scalar and vector fields.

Credits: 4

Prerequisites:

MATH 182

with a grade of C- or higher

Program: Mathematics

Semester Offered: Fall

MATH 298: Individual Study Topics

Designed for the student who wishes to do independent study or research. Content and method of study must be arranged prior to registration. May be repeated for a total of 2 credits.

Credits: 1-2

Prerequisites:

Approval by the department chair

Program: Mathematics

MATH 299: Directed Group Study Topics

Provides academic departments an opportunity to offer courses in specialized or experimental areas, either lower or upper division, not listed in the undergraduate *Bulletin*. May be repeated for a total of 3 credits.

Credits: 1-3

Prerequisites:

Approval by department chair

Program: Mathematics

MATH 321: Differential Equations

This is a study of ordinary differential equations with emphasis on the analytic methods for solving them. This course covers first-order differential equations, higher-order differential equations, modeling with differential equations, system of linear differential equations, series solutions, and Laplace transforms.

Credits: 3

Prerequisites:

MATH 182

Program: Mathematics

Semester Offered: Spring even years

MATH 322: Partial Differential Equations

Partial differential equations, Fourier series, boundary value problems, Bessel functions, Legendre polynomials. Offered via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 321

Program: Mathematics

Semester Offered: Fall, odd years

MATH 341: Geometry

This course is a study of Euclidean and non-Euclidean geometry. The course is taught within a historical context with a chronological introduction to the history of geometry. The mathematics from ancient times to calculus, together with selected topics from the history of modern mathematics. Offered via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 211

Program: Mathematics

Semester Offered: Fall, odd years

MATH 361: Introduction to Linear Algebra

An introduction to vector spaces and matrix theory over the field of real numbers.

Credits: 3

Prerequisites:

MATH 283

MATH 211

also recommended.

Program: Mathematics

Semester Offered: Spring odd years

MATH 371: History of Mathematics

A survey of the development of classical mathematics from ancient times to calculus, together with selected topics from the history of modern mathematics. Offered Fall even years via Southwestern's virtual classroom from [Southern Adventist University](#), and Spring even years via Southwestern's virtual classroom from Union College, NE.

Credits: 3

Prerequisites:

MATH 211

Program: Mathematics

Semester Offered: Fall, even years

Spring even years

MATH 381: Complex Variables

This course is a study of analytic functions, power series, calculus of residues, and conformal mappings. Offered via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 283

MATH 211

Program: Mathematics

Semester Offered: Spring even years

MATH 411: Numerical Analysis with Application

This is a course in numerical methods for solving mathematical problems. It covers solution of linear equations, roots of polynomial equations, interpolation and approximation, numerical differentiation and integration, solution of ordinary differential equations, and error analysis. The writing of computer programs for solving problems is a part of the course. Offered via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 211

and knowledge of a computer programming language (CSIS 110 is recommended).

Program: Mathematics

Semester Offered: Spring odd years

MATH 431: Abstract Algebra

A study of the abstract systems: groups, rings, fields, and integral domains. Offered fall even years via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 211

Program: Mathematics

Semester Offered: Fall

MATH 441: Calculus-Based Probability Theory

A study of the basic ideas of probability theory, discrete and continuous random variables, and their distributions. Offered fall, even years via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 4

Prerequisites:

MATH 182

Program: Mathematics

Semester Offered: Fall, even years

MATH 442: Actuarial Exam P Preparation

This course prepares students to take Exam P from the Society of Actuaries. Offered via Southwestern's virtual classroom from Union College, NE.

Credits: 3

Prerequisites:

MATH 441

Program: Mathematics

Semester Offered: Spring odd years

MATH 461: Number Theory

A study of topics including Diophantine equations, congruences, prime numbers, and applications. Emphasis is placed on proving theorems.

Credits: 3

Prerequisites:

MATH 211

Program: Mathematics

Semester Offered: Spring, Even Years

MATH 471: Real Analysis

This is a study of functions of one real variable, and the conditions for differentiability and for integrability of these functions. Emphasis is placed on proving theorems. Offered fall odd years via Southwestern's virtual classroom from [Southern Adventist University](#).

Credits: 3

Prerequisites:

MATH 283

MATH 211

Program: Mathematics

Semester Offered: Fall

MATH 484: Mathematics Seminar

Oral presentation of research papers or articles from the variety of topics in mathematics.

Credits: 1

Prerequisites:

Senior level standing

Program: Mathematics

Semester Offered: Fall

MATH 485: Portfolio

This course fulfills the requirement for a capstone/portfolio completion course.

Credits: 1

Prerequisites:

MATH 484

Program: Mathematics

Semester Offered: Spring

MATH 498: Individual Study Topics

Designed for the student who wishes to do independent study or research as well as a mathematics lecture based course covering a topic not routinely offered. Content and method of study must be arranged prior to registration. May be repeated for a total of 3 credits.

Credits: 1-3

Prerequisites:

Approval by the department chair

Program: Mathematics

MATH 499: Directed Group Study Topics

Provides academic departments an opportunity to offer courses in specialized or experimental areas, either lower or upper division, not listed in the undergraduate *Bulletin*. . May be repeated for a total of 3 credits.

Credits: 1-3

Prerequisites:

Approval by department chair

Program: [Mathematics](#)