

MATHEMATICS

The USAO mathematics program is designed to meet the needs and interests of the general student, provide the mathematics background required by students in the physical and behavioral sciences, and develop the maturity and competence required by the student preparing for a teaching and/or research career in mathematics.

Bachelor of Science in Mathematics

Required Math Core (41 hours):

<i>Course</i>	<i>Title</i>	<i>Hours Required</i>
MATH 1513	College Algebra	3
MATH 1613	Trigonometry	3
MATH 1743	Calculus & Analytic Geometry I	3
MATH 2223	Calculus & Analytic Geometry II	3
MATH 2243	Calculus & Analytic Geometry III	3
MATH 3233	Linear Algebra *	3
MATH 3243	Calculus & Analytic Geometry IV	3
MATH 3253	Foundations of Mathematics	3
MATH 3313	Advanced Euclidean Geometry *	3
MATH 3323	Modern Algebra I	3
MATH 3333	Modern Algebra II *	3
MATH 3353	Differential Equations *	3
MATH 3363	Advanced Calculus I *	3
MATH 3373	Advanced Calculus II *	3
MATH 4303	Probability & Statistics I *	3
MATH 4403	Probability & Statistics II *	3
MATH 4413	Numerical Analysis *	3
MATH 4423	Complex Variable Theory *	3
<i>and</i>		
PHYS 2114	General Physics I	4
<i>* Choose 4 of these courses for a total of 12 hours</i>		

Bachelor of Science in Mathematics/ Teacher Certification

This program qualifies individuals to obtain an Oklahoma teaching certificate and teach mathematics in grades 5-12. For a program checklist for teacher certification, students should consult the mathematics education advisor.

Required Professional Education Core (34 hours)

Required Math Core (48 hours):

<i>Course</i>	<i>Title</i>	<i>Hours Required</i>
MATH 1513	College Algebra	3
MATH 1613	Trigonometry	3
MATH 1743	Calculus & Analytic Geometry I	3
MATH 2223	Calculus & Analytic Geometry II	3
MATH 2243	Calculus & Analytic Geometry III	3
MATH 3233	Linear Algebra	3
MATH 3243	Calculus & Analytic Geometry IV	3
MATH 3253	Foundations of Mathematics	3
MATH 3313	Advanced Euclidean Geometry	3
MATH 3323	Modern Algebra I	3
MATH 4303	Probability & Statistics I	3
MATH 4403	Probability & Statistics II	3
MATH 4463	Teaching Mathematics in Secondary School	3
<i>and</i>		

PHYS 1301	General Physics Laboratory I	1
PHYS 2114	General Physics I	4

Minor in Mathematics

18 hours in mathematics from the following (*with approval of math advisor*):

MATH 1743	Calculus & Analytic Geometry I	3
MATH 2223	Calculus & Analytic Geometry II	3
MATH 2243	Calculus & Analytic Geometry III	3
MATH 3233	Linear Algebra	3
MATH 3243	Calculus & Analytic Geometry IV	3
MATH 3253	Foundations of Mathematics	3
MATH 3313	Advanced Euclidean Geometry	3
MATH 3323	Modern Algebra I	3
MATH 3353	Differential Equations	3
MATH 4303	Probability and Statistics I	3
MATH 4403	Probability and Statistics II	3

COURSE LISTINGS in MATHEMATICS

0103 BASIC MATH SKILLS

Whole number, integer, and real number operations, fractions, decimals, ratio and proportion, percents. Tuition fee for a 3-hour course; no credit.

0123 BASIC ALGEBRA SKILLS

The real numbers, absolute value, polynomials, factoring, rational expressions, rational exponents, radicals, complex numbers, linear equations and applications, quadratic equations and applications, inequalities. Tuition fee for a 3-hour course; no credit. Prerequisite MATH 0103 or equivalent.

1513 COLLEGE ALGEBRA

Functions and graphs, quadratic equations including systems of quadratic equations; binomial theorem; progressions; logarithms; and exponential functions; determinants; inequalities. 3 hours. Prerequisite: MATH 0123 *or* an ACT mathematics score of 19 or higher.

1613 TRIGONOMETRY

Study of trigonometric functions; identities; equations; and applications. 3 hours. Prerequisite or co-requisite: MATH 1513

1743 CALCULUS & ANALYTIC GEOMETRY I

Topics covered include equations of straight lines: conic sections; functions and their graphs; rates of change; limits and continuity of elementary functions; derivatives; applications of derivatives including extreme value problems and curve sketching. 3 hours. Prerequisites: MATH 1513 *and* MATH 1613 *or* the equivalent.

2113 NUMBER SYSTEMS AND PROBLEM SOLVING

Inductive and deductive reasoning, relations and functions, number theory, the systems of whole numbers, integers, rational numbers and real numbers, mental math & estimation, proportional reasoning and percents. 3 hours. Prerequisites IDS 1223 or equivalent *and* MATH 0123 *or* an ACT mathematics score of 19 or higher.

2203 ELEMENTARY STATISTICS

An introduction to statistical principles and probability, with applications in business, social and behavioral sciences. 3 hours. Prerequisite: MATH 0123 *or* an ACT mathematics score of 19 or higher.

- 2213 FINITE MATH
Elements of set theory. Matrix and determinant, linear programming, decision theory, finance math, and probability theory. 3 hours. Prerequisite: MATH 0123 *or* an ACT mathematics score of 19 or higher.
- 2223 CALCULUS & ANALYTIC GEOMETRY II
Topics covered include antiderivatives; definite integrals, indefinite integrals; applications of integrals; differential and integral calculus of transcendental functions. 3 hours. Prerequisite: MATH 1743.
- 2243 CALCULUS & ANALYTIC GEOMETRY III
Topics covered include integration techniques; improper integral; sequences, infinite series, power series, calculus of polar curves, vector analysis. 3 hours. Prerequisite: MATH 2223.
- 2880 SPECIAL TOPICS
Special topics in mathematics. 1-4 hours (may be repeated for total of 6 hours).
- 2900 WORKSHOP
Guided study in mathematics under faculty supervision; various topics and methods of instruction. 1-4 hours (may be repeated for total of 6 hours with change in title and topic).
- 2990 TUTORIAL
Independent study in mathematics under faculty supervision. 1-4 hours (may be repeated for total of 9 hours with change in title and content).
- 3113 FOUNDATIONS OF GEOMETRY AND MEASUREMENT
Spatial reasoning, constructions, congruence and similarity, concepts of measurement, motion geometry and tessellations, and graphical representations of data. 3 hours. Prerequisite: MATH 2113 *and* admission to Teacher Education.
- 3233 LINEAR ALGEBRA
Systems of linear equations, vector spaces, linear transformations and matrices, dot products and cross products, eigenvalues, and eigenvectors. 3 hours. Prerequisite: MATH 1743 *or* equivalent.
- 3243 CALCULUS & ANALYTIC GEOMETRY IV
Topics covered include vector calculus, multivariable functions and their derivatives; extreme values; Lagrange multipliers; multiple integrals; integration in vector fields. 3 hours. Prerequisite: MATH 2243.
- 3253 FOUNDATIONS OF MATHEMATICS
Study of logic structure in mathematics, mathematical language and proof, set theory, relations and functions, and number system. 3 hours. Prerequisite: MATH 2223.
- 3313 ADVANCED EUCLIDEAN GEOMETRY
Logical structure and proofs in several geometries including affine, Euclidean and some finite geometries. 3 hours. Prerequisite *or* co-requisite: MATH 3253.
- 3323 MODERN ALGEBRA I
Introduction to algebraic properties of groups, rings, fields and other abstract algebras. 3 hours. Prerequisite: MATH 3253.
- 3333 MODERN ALGEBRA II
Continuation of MATH 3323. 3 hours. Prerequisite: MATH 3323.
- 3353 DIFFERENTIAL EQUATIONS
Study of some ordinary differential equations, their applications, and methods of obtaining solutions. 3 hours. Prerequisite: MATH 3243.

3363 ADVANCED CALCULUS I

Rigorous treatment of topics, including advanced topics in calculus of one variable, calculus of several variables, sequences and series, vector calculus, line and surface integrals. Green's and Stoke's theorems. 3 hours. Prerequisite: MATH 3243.

3373 ADVANCED CALCULUS II

Continuation of MATH 3363. 3 hours. Prerequisite: MATH 3363.

4303 PROBABILITY AND STATISTICS I

Probability and statistical theory including such topics as conditional probability; distributions; moment generating functions; estimation and confidence intervals. 3 hours. Prerequisite: MATH 2223.

4403 PROBABILITY AND STATISTICS II

Continuation of MATH 4303. Study includes such topics as curve fitting; testing hypotheses; decision making; estimation; small sample distributions; nonparametric methods; regression; correlation and analysis of variance. 3 hours. Prerequisites: MATH 3243 *and* MATH 4303.

4413 NUMERICAL ANALYSIS

Selected topics in this field including approximation theory; iterative methods for solving equations; interpolation; numerical differentiation and integration; and difference equations. Emphasis on methods of high speed computing. 3 hours. Prerequisites: CSCI 2243 *and* MATH 3243.

4423 COMPLEX VARIABLE THEORY

Complex numbers, elementary functions and analytic functions, conformal mappings, complex integrals, power series, and integration by the method of residues. 3 hours. Prerequisite: MATH 3243.

4450 SEMINAR

Selected topics in mathematics. Topic of study will vary; seminar may be repeated for additional credit with each change in content to total of 6 hours. 1-3 hours.

4463 TEACHING MATHEMATICS IN THE SECONDARY SCHOOL

Survey of methods and materials used in teaching mathematics in secondary school. 3 hours. Prerequisite: admission to Teacher Education in mathematics. Education credit only.

4880 SPECIAL TOPICS

Special topics in mathematics. 1-4 hours (may be repeated for total of 6 hours).

4900 WORKSHOP

Related topics and problems in mathematics. 1-6 hours (may be repeated for total of 9 hours with change in title and content).

4990 TUTORIAL

Independent study in mathematics under faculty supervision. 1-4 hours (may be repeated for total of 9 hours with change in title and content).