MATHEMATICS (MATH)

MATH 90 – Elementary Algebra 3 credit hours
This course deals with elementary concepts of algebra which are usually taught at the 9th grade level. Emphasis is placed on developing functional competence in the several areas of algebra which are covered, and the content includes some practical applications. Not a General Studies course. Credit will not count toward any UNK degree. Placement: Math ACT score of 16 or less.

MATH 101 – Intermediate Algebra 3 credit hours
The course which includes a study of the properties of real numbers, polynomials, fundamental operations, factoring, exponents, and radicals, linear and quadratic equations, and other selected topics, all of which are necessary for the study of college algebra. Not a General Studies course. Prerequisite: MATH 090 or Math ACT Score of 17 or greater and one year of high school algebra. Enrollment in MATH 101 is not allowed if successfully completed (Grade of C or greater) another mathematics or statistics course for which this course is a prerequisite.

MATH 102 – College Algebra 3 credit hours
A college level algebra course which includes a study of linear equations and inequalities, relations and functions, graphing of linear and quadratic functions, polynomial and rational functions, logarithmic and exponential functions, systems of equations, matrices, sequences and series, and other selected topics all of which are necessary for the study of calculus. Prerequisite: MATH 101 or Math ACT Score of 20 or greater and two years of high school algebra. Enrollment in MATH 102 is not allowed if successfully completed (Grade of C or greater) another mathematics or statistics course for which this course is a prerequisite.

MATH 103 – Plane Trigonometry 3 credit hours
Study of trigonometric functions. Prerequisite: MATH 102 or Math ACT Score of 22 or greater and two years of high school algebra. Enrollment in MATH 103 is not allowed if successfully completed (Grade of C or greater) another mathematics or statistics course for which this course is a prerequisite.

MATH 104 – Concepts in Mathematics and Statistics 3 credit hours
An algebra course designed specifically for students going into elementary education. Many of the topics are similar to topics found in a traditional college algebra course. However, topics from the areas of probability and statistics have been included to give the prospective elementary teacher the necessary background to meet state and national curriculum standards for elementary mathematics. Prerequisite: MATH 101 or Math ACT Score of 20 or greater and 4 years of high school mathematics. Enrollment in MATH 104 is not allowed if successfully completed (Grade of C or greater) another mathematics or statistics course for which this course is a prerequisite.

MATH 106 – Mathematics for Liberal Arts 3 credit hours
An enrichment course investigating the structure, aesthetics and philosophy of mathematics and its cultural relevance. Prerequisite: MATH 101 or Math ACT Score of 17 or greater and 2 years of high school algebra.

MATH 115 – Calculus I with Analytic Geometry 5 credit hours
Limits and continuity, differentiation of algebraic and trigonometric functions, elementary integration (with applications) of algebraic and trigonometric functions. Prerequisite: MATH 103 or Math ACT score of 23 or above 4 yrs HS math including 2 yrs algebra 1 yr geom sr level pre-calc. Enrollment in MATH 115 is not allowed if successfully completed (Grade of C or above) another math or stats course for which this course is a prerequisite.

MATH 120 – Finite Mathematics 3 credit hours
An introduction to modern mathematical concepts, with applications. Includes logic, set theory, probability, vectors, matrices, linear programming, and game theory. Prerequisite: MATH 102 or Math ACT score of 22 or greater and two years of high school algebra.

MATH 123 – Applied Calculus I 3 credit hours
The concepts of calculus with emphasis on applications to the areas of business, biology, economics, and the social and behavioral sciences. Credit cannot be received for both MATH 115 and 123. Prerequisite: MATH 102 or Math ACT score 22/above 4 yrs HS math including 2 yrs algebra 1 yr geom sr level precalc. Enrollment in MATH 123 is not allowed if successfully completed (Grade of C or above) another math/stats course for which this course is a prerequisite.

MATH 202 – Calculus II with Analytic Geometry 5 credit hours
A continuation of MATH 115 including the differentiation and integration of transcendental functions, methods of formal integration with applications, series. Prerequisite: MATH 115 or Math ACT score of 25 or greater and one year of high school calculus.

MATH 230 – Math for Elementary Teachers I 3 credit hours
In this course, preservice teachers develop knowledge of mathematics important for the effective teaching of PK-6 students. The mathematical topics investigated in the course include problem solving, the number system, alternate base systems, operations with whole numbers and integers, introductory number theory concepts, and data analysis. In all of these topics, preservice teachers learn to develop appropriate mathematical explanations, understand student reasoning about mathematics, and communicate mathematical reasoning. Prerequisite: MATH 102 or MATH 104 or Math ACT score of 20 or greater and four years of high school mathematics including two years of algebra and one year of geometry and a senior level mathematics course.

MATH 250 – Foundations of Math 3 credit hours
Topics of sets and symbolic logic are studied with the objective of using them in the detailed study of the nature of different types of proofs used in mathematics. Also, the processes of problem solving are studied for developing strategies of problem solving. Prerequisite: MATH 115 or MATH 123

MATH 260 – Calculus III 5 credit hours
A continuation of MATH 202. Vector calculus, partial derivatives and multiple integrals. Department Consent Required Prerequisite: MATH 202 or equivalent preparation.

MATH 305 – Differential Equations 3 credit hours
Methods of solution and applications of common types of differential equations. Prerequisite: MATH 260

MATH 310 – College Geometry 3 credit hours
Mathematical systems and re-examination of Euclidean geometry from an advanced viewpoint. Prerequisite: MATH 250

MATH 330 – Math for Elementary Teachers II 3 credit hours
Algebraic and geometric topics as related to elementary mathematics. Prerequisite: MATH 230

MATH 350 – Abstract Algebra 3 credit hours
An introduction to modern algebra, including a brief study of groups, rings, integral domains and fields. Prerequisite: MATH 250 or permission of instructor.
MATH 365 – Complex Analysis 3 credit hours
Complex analysis is an introduction to the theory of complex variables and the calculus of analytic functions. Topics covered include the calculus of residues, the Cauchy Integration theorem, and the extension of exponential, logarithmic, and trigonometric functions to the complex plane.
Prerequisite: MATH 260

MATH 399 – Internship 1-4 credit hours
On the job experience designed to complement the major. Internship experiences are available only in selected areas. Consult with the departmental advisor. MATH 399 is a credit/no credit course.
Total Credits Allowed: 4.00

MATH 400 – History of Mathematics 3 credit hours
An introduction to the history of mathematics from its primitive origins to modern-day mathematics.
Prerequisite: MATH 115

MATH 404 – Theory of Numbers 3 credit hours
Properties of integers, congruencies, primitive roots, arithmetic functions, quadratic residues, and the sum of squares.
Prerequisite: MATH 250 or permission of instructor.

MATH 413 – Discrete Mathematics 3 credit hours
Topics include mathematical induction, recursion relations, counting principles, and discrete probability. Additional topics may include graph theory.
Prerequisite: MATH 250

MATH 414 – Theory of Compound Interest 3 credit hours
A study of the forces of interest, accumulated values, present value factors, annuities certain, amortization schedules, sinking funds, bonds, and securities.
Prerequisite: MATH 115 or MATH 123

MATH 420 – Numerical Analysis 3 credit hours
The solution of nonlinear equations, interpolation and approximation, numerical integration, matrices and system of linear equations, and numerical solution of differential equations.
Prerequisite: MATH 260 or permission of instructor

MATH 430 – Middle School Mathematics 3 credit hours
Topics will build on the foundations of MATH 230 and MATH 330 be focused toward the middle school math curriculum: algebraic structures including variables and functions, introductory number theory, probability, statistics, geometry, and problem solving.
Prerequisite: MATH 115 or MATH 202 or MATH 230 or MATH 260.

MATH 440 – Linear Algebra 3 credit hours
Vector spaces, linear transformations, matrices, and determinants.
Prerequisite: MATH 115 or MATH 202 or MATH 260

MATH 460 – Advanced Calculus I 3 credit hours
Functions, sequences, limits, continuity, differentiation and integration.
Prerequisite: MATH 250 and MATH 260

MATH 470 – Methods in Middle and High School Mathematics Teaching 3 credit hours
In this course, preservice teachers develop research-based knowledge and instructional practices that facilitate mathematics learning for grades 6-12 students. The topics investigated in the course include mathematics instructional methodology, research literature, diversity and equity, mathematics standards and curricula, assessment, and the development of effective mathematics lesson plans and curricular units. In addition, preservice teachers examine the importance of continuously improving teaching of mathematics through teacher reflection, instructional leadership, and professional development.
Prerequisite: MATH 430 and admission to Teacher Education.

MATH 490 – Special Topics in Mathematics 1-3 credit hours
Topics chosen from the areas of mathematics appropriate to the student's program and will involve both formal lectures and independent study.
Total Credits Allowed: 3.00

MATH 495 – Independent Study in Mathematics 1-3 credit hours
An individual investigation by the student of topics not included in the normal mathematics offerings.
Department Consent Required
Total Credits Allowed: 3.00
Prerequisite: MATH 260

MATH 496 – Mathematics Seminar 1 credit hour
Topics not included in the normal mathematics offerings are presented by the students.
Prerequisite: MATH 260 or permission of instructor.