DEPARTMENT OF MATHEMATICS AND STATISTICS

Department Objectives

- To prepare students to pursue graduate programs in mathematics or statistics;
- To prepare students for careers in mathematics education;
- To provide entry-level training for those wishing to pursue careers in actuarial science or business;
- To provide the courses to meet the requirements of General Studies;
- To provide the courses to meet the service functions for departments requiring knowledge of mathematics.

Department Policies

- Placement in the proper course is of utmost importance to the student and the Department. The ACT math score is used to place traditional entering freshmen in our entry level college mathematics courses. Consult the departmental course listings for information on minimal ACT math score requirements for our entry level courses.
- Students who have completed a full year of Calculus in high school may start in Calculus II or Calculus III.
- CLEP Examination must be taken before completing higher level courses.
- All majors and endorsements must be completed with no grade below a "C."
- Math 090 credit will not count toward any university degrees.
- Students will not be allowed to earn credit for either MATH 090 or MATH 101 after earning credit for any General Studies mathematics class. Students will not be allowed to earn credit for MATH 102 or MATH 123 after earning credit for MATH 115. Students will not be allowed to earn credit for MATH 102 after earning credit for MATH 123. Students will not be allowed to earn credit for both STAT 235 and STAT 241.

Mathematics Major

Three options are available in this major:

   or Mathematics (http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/mathematics-statistics/mathematics-bs) - Bachelor of Science Degree
3. Mathematics 6-12 Teaching Field Endorsement (http://catalog.unk.edu/catalog-archive/2019-2020/undergraduate/departments-programs/mathematics-statistics/mathematics-6-12-teaching-field-endorsement) - Bachelor of Science in Education Degree


TBD, Chair

Professor: Barton Willis

Associate Professor: Jia Huang, Katherine Kime, Amy Nebesniak, Jacob Weiss

Assistant Professor: Derek Boeckner, Scott Gensler, Theodore Rupnow, Nathan Vander Werf

Senior Lecturer: Julieta Johnston, Margaret Michener, Patty Reifenrath, Kaye Sorensen

Lecturer: Paul Bonk

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 Students may not enroll in MATH 101 after earning credit for any General Studies Mathematics class.

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 Students may not enroll in MATH 102 after earning credit for MATH 115 or MATH 123..

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

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

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

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.

Statistics (STAT)

STAT 235 – Introduction to Statistics for Social Sciences 3 credit hours  
An introduction to statistics for educational and sociological research. The course will include descriptive statistics, normal distribution and an introduction to correlation and hypothesis testing.  
Prerequisite: Completion of MATH 101 or MATH 102 or MATH 115 or MATH 123 or Math ACT score of 20 or greater Students may not enroll in STAT 235 after earning credit for STAT 241.

STAT 241 – Elementary Statistics 3 credit hours  
An introduction to statistics for sciences and business. The course will include graphing techniques, descriptive statistics, elementary probability models, estimation and hypothesis testing, and an introduction to correlation and regression.  
Prerequisite: MATH 101 or MATH 102 or MATH 123 or MATH 115 or ACT Math score of 20 or greater

STAT 345 – Applied Statistics I 3 credit hours  
Descriptive statistics; statistical inference using the binomial, normal, F and Chi Square distributions; and analysis of variance topics. Recommended for departmental majors as the beginning applied statistics course.  
Prerequisite: MATH 115 or MATH 123

STAT 399 – Internship 1-4 credit hours  
On the job experience designed to complement the major. Internships are available only in selected areas. Consult with departmental advisor.  
(Credit/No Credit)  
Total Credits Allowed: 4.00  
Prerequisite: MATH 115 or MATH 123

STAT 441 – Probability and Statistics 3 credit hours  
The mathematical development of discrete and continuous probability distributions including multivariate distributions, moments and moment generating functions, the special discrete and continuous probability distributions, the normal distribution, sampling distributions, and hypothesis testing.  
Prerequisite: MATH 260

STAT 442 – Mathematical Statistics 3 credit hours  
A continuation of STAT 441. The further mathematical development of special probability densities, functions of random variables, sampling distributions, decision theory, point and interval estimators, hypotheses testing, and covariance.  
Prerequisite: STAT 441

STAT 495 – Independent Study in Statistics 1-3 credit hours  
An individual investigation by the student of topics not included in the normal statistics offerings.  
Department Consent Required  
Total Credits Allowed: 3.00