

# MATHEMATICS (MATH)

## MATH 0000 Math Recitation Sessions

**Credit:** 1 (0-0-0)

**Restrictions:**

**Repeat Status:** Course may be repeated 99 time(s).

## MATH 0114 Mathematics Support Course for MATH 1314

**Credit:** 1 (0-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1314, including communication and appropriate use of technology. Topics include the study of the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1314.

**Restrictions:**

## MATH 0124 Mathematics Support Course for MATH 1324

**Credit:** 1 (0-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1324, including communication and appropriate use of technology. Topics include the study of the real number system; algebraic concepts, notation, and reasoning, including applications for business and the social sciences; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1324.

**Restrictions:** Graduate level students may not enroll.

## MATH 0132 Mathematics Support Course for MATH 1332

**Credit:** 1 (0-1-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1332, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1332.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 3 time(s).

## MATH 0142 Mathematics Support Course for MATH 1342

**Credit:** 1 (0-1-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1342, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; probability and quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1342.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 3 time(s).

## MATH 0214 PAC Math - 2hr Lab

**Credits:** 2 (0-0-0)

**Restrictions:**

## MATH 0314 Mathematics Support Course for MATH 1314

**Credits:** 3 (3-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1314, including communication and appropriate use of technology. Topics include the study of the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1314.

**Restrictions:** Graduate level students may not enroll.

## MATH 0324 Mathematics Support Course for MATH 1324

**Credits:** 3 (3-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1324, including communication and appropriate use of technology. Topics include the study of the real number system; algebraic concepts, notation, and reasoning, including applications for business and the social sciences; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Restrictions:**

## MATH 0332 Mathematics Support Course for MATH 1332

**Credits:** 3 (3-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1332, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Corequisites:** MATH 1332.

**Restrictions:** Graduate level students may not enroll.

## MATH 0342 Mathematics Support Course for MATH 1342

**Credits:** 3 (3-0-0)

This course supports students in developing skills, strategies, and reasoning needed to succeed in MATH 1342, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; probability and quantitative relationships; mathematical models; and problem solving. This support course is not a college-level course and should be graded Pass/Fail.

**Restrictions:**

## MATH 0400 PAC Math - 4hr

**Credits:** 4 (0-0-0)

**Restrictions:**

## MATH 0500 PAC Math - 5hr

**Credits:** 5 (5-0-0)

**Restrictions:**

## MATH 0501 PAC Math - 1314/0214

**Credits:** 5 (5-0-0)

**Restrictions:**

**MATH 1014 College Algebra Recitation****Credits:** 0 (0-1-0)

This mathematics recitation course has been designed to supplement MATH 1314: College Algebra. Recitation time is designed to give college algebra students extra time, help, and instruction that is valuable for success in the course. Must be enrolled in corresponding MATH 1314 section.

**Prerequisites:** Evidence of math equivalent to high school Algebra II (grade of 'C' or higher) or placement.

**Corequisites:** MATH 1314. TSI Restriction(s): Reading, and Writing

**Restrictions:** \* May be taken concurrently. Enrollment is limited to Undergraduate level students.

**MATH 1024 Math Bus/Soc Sci I Recitation****Credits:** 0 (0-1-0)

This mathematics recitation course has been designed to supplement MATH 1324: Mathematics for Business and Social Sciences I. Recitation time is designed to give Mathematics for Business and Social Sciences I students extra time, help, and instruction that is valuable for success in the course. Must be enrolled in corresponding MATH 1324 section.

**Prerequisites:** Evidence of math equivalent to high school Algebra II (grade of 'C' or higher) or placement.

**Corequisites:** MATH 1324. TSI Restriction(s): Reading, and Writing

**Restrictions:** \* May be taken concurrently. Enrollment is limited to Undergraduate level students.

**MATH 1025 Math Bus/Soc Sci II Recitation****Credits:** 0 (0-1-0)

This mathematics recitation course has been designed to supplement MATH 1325: Mathematics for Business and Social Sciences II. Recitation time is designed to give Mathematics for Business and Social Sciences II students extra time, help, and instruction that is valuable for success in the course. Must be enrolled in corresponding MATH 1325 section.

**Prerequisites:** MATH 1314, MATH 1324, or equivalent, (with grade of 'C' or better), or department approval.

**Corequisites:** MATH 1325. TSI Restriction(s): Reading, and Writing

**Restrictions:** \* May be taken concurrently. Enrollment is limited to Undergraduate level students.

**MATH 1042 Intro Statistics Recitation****Credits:** 0 (0-1-0)

This mathematics recitation course has been designed to supplement MATH 1342: Introductory Statistics. Recitation time is designed to give Introductory Statistics students extra time, help, and instruction that is valuable for success in the course. Must be enrolled in corresponding MATH 1342 section.

**Corequisites:** MATH 1342. TSI Restriction(s): Reading, and Writing

**Restrictions:** \* May be taken concurrently. Enrollment is limited to Undergraduate level students.

**MATH 1314 College Algebra****Credits:** 3 (3-0-0)

In-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices. Additional topics such as sequences, series, probability, and conics may be included. This course meets the standards for the Mathematics category of courses under the core curriculum. TSI Restriction(s): Reading, Math, and Writing.

**Prerequisites:** Evidence of math equivalent to High School Algebra II ("C" or higher) or placement.

**Corequisites:** MATH 1014 or MATH 0314.

**Restrictions:** Graduate level students may not enroll.

**MATH 1316 Trigonometry****Credits:** 3 (3-0-0)

This course is a study of trigonometric functions, their properties, and applications of trigonometric functions of angles, degree and radian measure, circular functions, graphs, identities, inverse trigonometric functions, polar coordinates, solution of general triangles, and complex numbers. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Math 1314 with a minimum grade of "C" or equivalent as approved by department.

**Restrictions:** Graduate level students may not enroll.

**MATH 1324 Math for Bus/Soc Sci I****Credits:** 3 (3-0-0)

Students will study topics from college algebra (linear equations, quadratic equations, functions and graphs, inequalities), mathematics of finance (simple and compound interest, annuities), linear programming, matrices, systems of linear equations, and applications to management, business and social sciences. This course meets the standards for the Mathematics category of courses under the core curriculum.

**Prerequisites:** Evidence of math equivalent to High School Algebra II ("C" or higher) or placement.

**Corequisites:** MATH 1024 or MATH 0314. TSI Restriction(s): Reading, Math, and Writing

**Restrictions:** Graduate level students may not enroll.

**MATH 1325 Math for Bus/Soc Sci II****Credits:** 3 (3-0-0)

This course is the basic study of limits and continuity, differentiation, optimization and graphing, and integration of elementary functions with emphasis on applications in business, economics, and social sciences. This course is not a substitute for MATH 2313, Calculus I.

**Prerequisites:** MATH 1314 College Algebra or MATH 1324 Mathematics for Business and Social Sciences (with a grade of "C" or higher) or equivalent or department approval.

**Corequisites:** MATH 1025. TSI Restriction(s): Reading, Math, and Writing

**Restrictions:** \* May be taken concurrently. Graduate level students may not enroll.

**MATH 1332 Contemporary Mathematics I****Credits:** 3 (3-0-0)

This course is a study of an introduction to treatments of sets, logic, number systems, number theory, relations, functions, probability, and statistics. Appropriate applications are included. This course meets the standards for the Mathematics category of courses under the core curriculum. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Evidence of math equivalent to High School Algebra II or placement.

**Restrictions:** Graduate level students may not enroll.

**MATH 1342 Introductory Statistics****Credits:** 3 (3-0-0)

Students will study the collection, analysis, presentation and interpretation of data, and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals and hypothesis testing. Appropriate technology used. This course meets the standards for the Mathematics category of courses under the core curriculum.

**Prerequisites:** Evidence of math equivalent to High School Algebra II ("C" or higher) or placement.

**Corequisites:** MATH 1042 or 0342. TSI Restriction(s): Reading, Math, and Writing

**Restrictions:** Graduate level students may not enroll.

**MATH 1350 Fundamentals of Mathematics I****Credits:** 3 (3-0-0)

Study of the concepts of sets, functions, numeration systems, number theory, and properties of the natural numbers, integers, rational, and real number systems with an emphasis on problem solving and critical thinking.

**Prerequisites:** MATH 1314 College Algebra or equivalent.

**Restrictions:** Graduate level students may not enroll.

**MATH 1351 Fundamentals of Mathematics II****Credits:** 3 (3-0-0)

Study of the concepts of geometry, probability, and statistics, as well as applications of the algebraic properties of real numbers to concepts of measurement with an emphasis on problem solving and critical thinking. This course is designed specifically for student who seek middle grade (4 through 8) teacher certification.

**Prerequisites:** MATH 1350 with a grade of C or higher or equivalent.

**Restrictions:** Graduate level students may not enroll.

**MATH 2012 Pre-Calculus Recitation****Credits:** 0 (0-1-0)

This course provides a lab framework for exploring and reinforcing Pre-Calculus concepts studied in MATH 2312 and must be taken concurrently with MATH 2312.

**Prerequisites:** MATH 1314 College Algebra with a grade of C or higher.

**Corequisites:** MATH 2312. TSI Restriction(s): Reading, Math, and Writing

**Restrictions:** Graduate level students may not enroll.

**MATH 2113 Calculus I Lab****Credit:** 1 (0-1-0)

This course provides a lab framework for exploring and reinforcing calculus concepts studied in MATH 2313 and must be taken concurrently with Math 2313.

**Prerequisites:** MATH 2312 Pre-Calculus with a grade of "C" or higher or equivalent or permission of department.

**Corequisites:** MATH 2313.

**Restrictions:** Graduate level students may not enroll.

**MATH 2114 Calculus II Lab****Credit:** 1 (0-1-0)

This course provides a lab framework for exploring and reinforcing calculus concepts studied in MATH 2314 and must be taken concurrently with Math 2314.

**Prerequisites:** MATH 2313 Calculus I and MATH 2113 both with a grade of "C" or higher or equivalent or permission of department.

**Corequisites:** MATH 2314.

**Restrictions:** \* May be taken concurrently. Graduate level students may not enroll.

**MATH 2190 Topics in Mathematics****Credit:** 1 (1-0-0)

Different topics in mathematics will be covered at varying times. May be repeated for credit with consent of the department. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 1314 or MATH 1324 with a grade of 'C' or higher, or consent of the instructor.

**Restrictions:** Enrollment is limited to Undergraduate level students.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 2290 Topics in Mathematics****Credits:** 2 (2-0-0)

Different topics in mathematics will be covered at varying times. May be repeated for credit with consent of the department. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 1314 or MATH 1324 with a grade of 'C' or higher, or consent of the instructor.

**Restrictions:** Enrollment is limited to Undergraduate level students.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 2312 Pre-Calculus****Credits:** 3 (3-0-0)

In-depth combined study of algebra, trigonometry, and other topics for calculus readiness. This course meets the standards for the Mathematics category of courses under the core curriculum and address the following required objectives: Critical Thinking, Communication, and Empirical Quantitative Skills.

**Prerequisites:** MATH 1314 College Algebra with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 2313 Calculus I****Credits:** 3 (3-0-0)

The course encompasses the study of limits, continuity, and derivatives of algebraic, trigonometric and transcendental functions and related applications to include maximizing or minimizing a function and rate of change problems. This course also introduces the definite integral, the Fundamental Theorem of Calculus and application to calculation of areas. Curve sketching and graphing tools will be utilized in exploring these concepts. Must be taken concurrently with MATH 2113.

**Prerequisites:** MATH 2312 Pre-Calculus with a grade of 'C' or higher, or equivalent or permission of department.

**Corequisites:** MATH 2113.

**Restrictions:** Graduate level students may not enroll.

**MATH 2314 Calculus II****Credits:** 3 (3-0-0)

Calculus II, a continuation of Calculus I, encompasses the study of integration of transcendental functions, techniques of integration, polar coordinates, improper integrals, sequences, and series. Must be taken concurrently with MATH 2114.

**Prerequisites:** MATH 2313 Calculus I and MATH 2113 both with a grade of C or higher, or equivalent or permission by department.

**Corequisites:** MATH 2114.

**Restrictions:** \* May be taken concurrently. Graduate level students may not enroll.

**MATH 2390 Topics in Mathematics****Credits:** 3 (3-0-0)

Different topics in mathematics will be covered at varying times. May be repeated for credit with consent of the department. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 1314 or MATH 1324 with a grade of "C" or higher, or consent of the instructor.

**Restrictions:** Enrollment is limited to Undergraduate level students.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 2490 Topics in Mathematics****Credits:** 4 (4-0-0)

Different topics in mathematics will be covered at varying times. May be repeated for credit with consent of the department. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 1314 or MATH 1324 with a grade of 'C' or higher, or consent of the instructor.

**Restrictions:** Enrollment is limited to Undergraduate level students.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 3301 Biostatistics****Credits:** 3 (3-0-0)

This course is for students in biology, health sciences, human sciences and wildlife science. Content includes descriptive and inferential statistics, basic probability concepts, probability distributions, statistical significance and hypotheses testing, correlation, simple linear regression, introduction to ANOVA, and interpreting statistical software output. May not be taken for credit as a math elective for students who major or minor in math. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 1314.

**Restrictions:** Students cannot enroll who have a program in Mathematics. Graduate level students may not enroll.

**MATH 3320 Differential Equations****Credits:** 3 (3-0-0)

The ordinary differential equations of physics, chemistry and engineering; methods for their solutions and the properties of their solution. Introduction to partial differential equations. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2314, MATH 2114 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3321 Applied Partial Differential Equations****Credits:** 3 (3-0-0)

This course provides an introduction to the basic concepts and widely used techniques of partial differential equations (PDEs) that are frequently used by applied scientists and engineers, et al. Topics covered include: PDEs and boundary value problems, waves and diffusions, Fourier series, the Laplace equation, the heat equation, harmonic functions, Green identities and Green functions, vibrations of continuous systems, the potential equation and spectral methods for eigenvalue problems. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3415 Calculus III and MATH 3320 Differential equations with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3325 Intro to Mathematical Proofs****Credits:** 3 (3-0-0)

This course is a study of the principles and techniques of interpreting, discovering and writing correct mathematical proofs. Students learn to independently prove theorems from various areas in mathematics, which may include topics from logic, the structure of the real number system, number theory, geometry and algebra. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2313, MATH 2113 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3326 History of Mathematics****Credits:** 3 (3-0-0)

This is an upper-division elective course on the BA/BS in Mathematics and/or with teacher certification. The history of mathematics is a vast subject, and this course concentrates on early mathematical discoveries from ancient Egypt, Mesopotamia, Greece, China, India, the Middle East, and Europe to the period right before Newton and Leibniz, assuming that the students would be exposed to subsequent developments in mathematics in other courses.

**Prerequisites:** MATH 2114 and MATH 2314: Calculus II and its Lab, with a grade C or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3340 Linear Algebra with Appl****Credits:** 3 (3-0-0)

Systems of linear equations, matrices, determinants, vector spaces, eigenvectors, eigenvalues, orthogonality, linear transformations and their representations by matrices, and applications. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2313, MATH 2113 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3350 Probability & Stats for Tchrs****Credits:** 3 (3-0-0)

Principles and practices of probability and statistics designed for education students seeking a Generalist (4-8) with Math concentration degree. The course explores statistical applications, applying descriptive statistics, interval estimates, hypothesis tests, linear regression with an emphasis on data description and interpretation. May not be taken for credit as a math elective for students who major or minor in math. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Math 1314.

**Restrictions:** Students cannot enroll who have a minor in Mathematics. Students in the BA\_MATH program may not enroll. Graduate level students may not enroll.

**MATH 3360 Modern Geometry****Credits:** 3 (3-0-0)

An axiomatic approach to geometry to include contrasting traditional and modern approaches to geometry, an introduction to non-Euclidean geometry with historical perspectives, and applications. May not be taken for credit as a math elective for students who minor in math. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Math 3325 with a grade of "C" or higher.

**Restrictions:** Students cannot enroll who have a minor in Mathematics. Graduate level students may not enroll.

**MATH 3370 Discrete Mathematics****Credits:** 3 (3-0-0)

This course covers many topics in mathematics which are important in computer science. Some of these topics are sets, relations, functions, algorithms, graphs, monoids, lattices, Boolean algebras and graphs. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3320, MATH 3325, MATH 3340 or MATH 3415; all Prerequisite(s) require a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3371 Problem Solving with Computers****Credits:** 3 (3-0-0)

Introduction to computational mathematics with a focus on strategies for solving problems using Computer Algebra Systems in various applications. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2313 (taken with MATH 2113 Calculus I Lab) or MATH 1325 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3372 Mathematical Biology****Credits:** 3 (3-0-0)

Students will investigate mathematical biology models such as population growth for single species and multiple species, infectious disease dynamics models, biochemical enzyme reactions, and biological oscillations. Appropriate mathematical techniques are applied to analyze the models and obtain solutions. Model improvements will also be evaluated for more practical modeling effects. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2313 Calculus I (taken with MATH 2113 Calculus Lab) or Math 1325 Mathematics for Business and Social Sciences II, with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 3373 Mathematical Physiology****Credits:** 3 (3-0-0)

This course introduces mathematical physiology models that describe various important functioning principles of human organs. Appropriate variables are included to capture the factors of interest. Students will study variables that are significant in maintaining a healthy physiological process and apply models to predict future pathological processes. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3372 Mathematical Biology.

**Restrictions:** Graduate level students may not enroll.

**MATH 3390 Selected Topics in Math****Credits:** 3 (3-0-0)

Different topics will be covered at varying times. May be repeated for credit with consent of the instructor.

**Prerequisites:** 3 semester hours of advanced mathematics.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 3415 Calculus III****Credits:** 4 (4-0-0)

This course covers sequences and series, functions of several variables, three dimensional geometry, partial derivatives, multiple integrals, line and surface integrals, Green's Theorem, Stroke's Theorem, and applications. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2314, MATH 2114 with a grade of "C" or higher.

**Restrictions:** \* May be taken concurrently. Graduate level students may not enroll.

**MATH 4180 Undergraduate Research in Math****Credit:** 1 (1-0-0)

Opportunities for student to conduct research at an advanced undergraduate level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced math beyond MATH 3325 with grades of `C' or higher or consent of the department head.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4190 Advanced Topics in Mathematics****Credit:** 1 (1-0-0)

Different advanced topics will be covered at varying times. May be repeated for credit with consent of the instructor. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced mathematics to include MATH 3325 with a grade of `C' or higher.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4280 Undergraduate Research in Math****Credits:** 2 (2-0-0)

Opportunities for student to conduct research at an advanced undergraduate level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced math beyond MATH 3325 with grades of `C' or higher or consent of the department head.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4290 Advanced Topics in Mathematics****Credits:** 2 (2-0-0)

Different advanced topics will be covered at varying times. May be repeated for credit with consent of the instructor. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced mathematics to include MATH 3325 with a grade of `C' or higher.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4301 Biostatistics****Credits:** 3 (3-0-0)

For students in biology, health sciences, human sciences and wildlife science. Descriptive and inferential statistics, basic probability concepts, probability distributions, estimation, hypothesis testing, correlation, simple linear regression, principles of epidemiology, statistical vs. clinical significance and quasi-statistical methods. May not be taken for credit as a math elective for students who major in math.

**Prerequisites:** MATH 1314.

**Restrictions:** Students cannot enroll who have a program in Mathematics.

**MATH 4303 Statistical Methods****Credits:** 3 (3-0-0)

Calculus-based probability, discrete and continuous random variables, joint distributions, sampling distributions, the central limit theorem, descriptive statistics, interval estimates, hypothesis tests, ANOVA, correlation and simple regression. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 2314, MATH 2114 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4321 Real Variables****Credits:** 3 (3-0-0)

A study of the real number system, its structure and properties to include an introduction to the theory of sets, properties of real-valued functions and sequences, limits, continuity, differentiation, and uniform convergence. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3325 and one of the following: MATH 3415, MATH 3370, MATH 3340, MATH 4340; Grade of "C" or higher for Prerequisite(s).

**Restrictions:** Graduate level students may not enroll.

**MATH 4325 Topology****Credits:** 3 (3-0-0)

This course provides an introduction to the basic concepts and techniques of point set topology that are frequently used by scientists, physicists, and engineers etc. Topics covered include: metric spaces, topological spaces, and continuous real-valued functions. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3325 and MATH 3415 both with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4330 Number Theory****Credits:** 3 (3-0-0)

The course explores fundamental concepts in elementary number theory to include divisibility, congruence relations, rational integers, Diophantine equations, quadratic reciprocity, integral domains, and related topics. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Math 3325 and Math 3370.

**Restrictions:** Graduate level students may not enroll.

**MATH 4340 Modern Algebra****Credits:** 3 (3-0-0)

A study of basic algebraic structures with applications from algebraic or analytic number theory. Topics include: properties of the Integers, prime factorization, congruences, finite groups, subgroups, cosets, homomorphisms, integral domains and rings. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3325 and one of the following: MATH 3415, MATH 3370, MATH 3340, MATH 4341; all Prerequisite(s) require a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4341 Linear Alg and Matrix Theory****Credits:** 3 (3-0-0)

A study of linear algebraic structures to include vector spaces, subspaces, bases, dimension and normed spaces. Related topics include: vector geometry, orthogonality, normal forms eigenvalues, linear and special transformations. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Any two of the following: MATH 3415, MATH 3325, MATH 3340, MATH 3370, MATH 4321, MATH 4330; all prerequisites require a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4345 Communicating Math in Wrkplc****Credits:** 3 (3-0-0)

This course is designed to connect the application of mathematical concepts from various core courses to communicate mathematical results effectively within a work environment. Topics include different roles a mathematician may take within an organization with emphasis on communicating and presenting results when applying various levels of modeling, analysis, and mathematical concepts.

**Prerequisites:** Math 3320 and Math 3370.

**Restrictions:** Graduate level students may not enroll.

**MATH 4350 Probability****Credits:** 3 (3-0-0)

Sample spaces, combinatorics, independence, conditional probability and Bayes' rule. Discrete and continuous probability distributions, Chebychev's inequality and limit theorems. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3415 or consent of the instructor.

**Restrictions:** Graduate level students may not enroll.

**MATH 4360 Introduction to Graph Theory****Credits:** 3 (3-0-0)

This course covers the fundamental concepts of graph theory including basic properties, simple graphs, digraphs, Eulerian and Hamiltonian graphs, trees, matchings, networks, paths and cycles, graph colorings, and planar graphs. Related applications and famous problems in graph theory will also be explored. Math 3370 recommended. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3340 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4370 Vector Analysis****Credits:** 3 (3-0-0)

The study of vector algebra and geometry, vector functions, and vector fields with applications to line and surface integrals. Some topics include vector operations, vector fields of motion in polar coordinates, and perspectives of generalized differential operators. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3415 with a grade of "C" or higher and MATH 3320 or equivalent.

**Restrictions:** Graduate level students may not enroll.

**MATH 4371 Laplace Transformation****Credits:** 3 (3-0-0)

An introduction to the theory of the Laplace Transformation. Applications to the solution of ordinary and partial differential equations, integral equations, difference equations and integro-differential equations. An introduction to other types of integral transformations.

**Prerequisites:** MATH 3415 and MATH 3320.

**Restrictions:** Graduate level students may not enroll.

**MATH 4374 Numerical Analysis****Credits:** 3 (3-0-0)

The mathematical formation of the concepts in numerical analysis. These concepts include the theory of errors, roots of equations, interpolation, linear systems of equations, numerical differentiation, and integration and solutions of ordinary differential equations. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3415 and MATH 3320 or consent of the instructor.

**Restrictions:** Graduate level students may not enroll.

**MATH 4375 Applied Complex Analysis****Credits:** 3 (3-0-0)

This course provides an introduction to the basic concepts and techniques of complex analysis that are frequently used by scientists, physicists, and engineers. Topics covered include: complex numbers, analytic and harmonic functions, Cauchy's integral theorem, Taylor and Laurent expansions, Cauchy's residue theorem, and conformal mappings. MATH 3320 and MATH 3360 recommended. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** MATH 3415 with a grade of 'C' or higher.

**Restrictions:** Graduate level students may not enroll.

**MATH 4380 Undergraduate Research in Math****Credits:** 1-3 (1-0-0)

Opportunities for advanced students to conduct research at an advanced undergraduate level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine semester hours of advanced math beyond MATH 3325 with a grade of 'C' or higher or consent of the department head.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4390 Advanced Topics in Mathematics****Credits:** 3 (3-0-0)

Different advanced topics will be covered at varying times, May be repeated for credit with consent of the instructor. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced mathematics to include MATH 3325 with a grade of "C" or higher.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4480 Undergraduate Research in Math****Credits:** 4 (4-0-0)

Opportunities for advanced students to conduct research at an advanced undergraduate level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine semester hours of advanced math beyond MATH 3325 with a grade of 'C' or higher or consent of the department head.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).

**MATH 4490 Advanced Topics in Mathematics****Credits:** 4 (4-0-0)

Different advanced topics will be covered at varying times, may be repeated for credit with consent of the instructor. TSI Restriction(s): Reading, Math, and Writing

**Prerequisites:** Nine hours of advanced mathematics to include MATH 3325 with a grade of 'C' or higher.

**Restrictions:** Graduate level students may not enroll.

**Repeat Status:** Course may be repeated 1 time(s).