MATH 090 | INTERMEDIATE ALGEBRA
Units: 3
A survey of basic algebraic skills for students with insufficient mathematics preparation. This remedial course counts for “work-load credit” only. That is, its three units are counted as part of the student’s load during the semester in which it is taken, and the grade earned in the course is included in the computation of the student’s grade point average, but it does not satisfy any core curriculum requirement, or for the major or minor in mathematics, and it does not count toward the 124 units required for graduation.

MATH 112 | INVESTIGATIONS IN MODERN MATHEMATICS
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 090
This core curriculum mathematics course provides a less algebraic alternative to MATH 115 for those students who need to fulfill the mathematical competency requirement, but who are not planning to go on in math. Topics may include: voting theory, graph theory, sequences, population growth, fractals, topology, geometry, and recursion. Note 1: This course does not serve as a prerequisite to MATH 120, MATH 130, MATH 150, or MATH 200.

MATH 115 | COLLEGE ALGEBRA
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 090
Review of exponents, equations, and inequalities; function notation, composition, and inverses; linear, quadratic, polynomial, exponential, and logarithmic functions and their graphs.

MATH 118 | ESSENTIALS OF TRIGONOMETRY
Units: 1
Definitions, solutions of right triangles, graphs, identities, and inverse trigonometric functions.

MATH 120 | INTRODUCTION TO STATISTICS
Units: 3 Repeatability: No
Core Attributes: Quantitative reasoning comp
Prerequisites: MATH 115 or MATH 130 or MATH 150
Probability as a mathematical system, random variables and their distributions, confidence intervals, hypothesis testing, and other topics in statistical inference.

MATH 130 | SURVEY OF CALCULUS
Units: 3 Repeatability: No
Core Attributes: First year Integration, Math reasoning and prob solving
Prerequisites: Passing the appropriate departmental placement test within the previous year or MATH 115 or MATH 130 or MATH 150 or MATH 151 or MATH 250
A terminal mathematics course giving an introduction to the concepts and techniques of elementary differential and integral calculus. Note 1: This course is not equivalent to MATH 150, and does not serve as a prerequisite to MATH 151. Prereq: MATH 115 with a grade of C– or better, or pass Level 2 mathematics placement exam (2MTH or 3MTH).

MATH 150 | CALCULUS I
Units: 4 Repeatability: No
Core Attributes: First year Integration, Math reasoning and prob solving
Prerequisites: MATH 115 or Passing the appropriate departmental placement test within the previous year
Fundamental notions of analytic geometry, differential and integral calculus with elementary applications; historical references.

MATH 151 | CALCULUS II
Units: 4 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 150
Continuation of Calculus I including integration, infinite series, differential equations, applications, and historical references.

MATH 160 | LOGIC FOR MATHEMATICS AND COMPUTER SCIENCE
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: Passing the appropriate departmental placement test within the previous year or MATH 115 or MATH 130 or MATH 150 or MATH 151 or MATH 250
Propositional calculus; first-order predicate calculus, mathematical proof, mathematical induction, fundamental set theory, relations and functions, and applications to problems in mathematics and computer science.

MATH 200 | MATHEMATICAL CONCEPTS FOR ELEMENTARY TEACHERS I
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 115 or MATH 130 or MATH 150
Problem solving, sets, numeration systems, a development of the whole number system, geometric figures, and computers. Note: This course does not count toward either the major or minor in mathematics.

MATH 222 | DISCRETE MATHEMATICS
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 151 or (MATH 150 and ENGR 121 or COMP 150)
Our world is inundated with discrete packets of data, from satellite imaging, to cyber security, to biotechnology. A language and framework is needed to understand, quantify, and manipulate this information. This course provides the tools (mathematical proof techniques) and case studies (sets and infinity, numbers and encryption, graphs and structure) to equip us for our data driven world.

MATH 250 | CALCULUS III
Units: 4
Prerequisites: MATH 151
Calculus of several variables, partial derivatives, multiple integration, elements of vector calculus, elements of differential equations, applications, and historical references. Prereq: MATH 151 with a grade of C– or better.

MATH 294 | SPECIAL TOPICS
Units: 3 Repeatability: No
Core Attributes: Math reasoning and prob solving
Prerequisites: MATH 151
Topics of special interest chosen by the instructor.

MATH 300 | MATHEMATICAL CONCEPTS FOR ELEMENTARY TEACHERS II
Units: 3
Prerequisites: MATH 200
Measurement concepts, development of the real number system, algebra, geometric mappings, probability, and statistics. Note: This course does not count toward either the major or minor in Mathematics. Prereq: MATH 200 with a grade of C– or better.
MATH 305 | SEMINAR IN TEACHING MATHEMATICS
Units: 2
Senior seminar for single subject credential students in mathematics. Issues in mathematics education including: Contribution to mathematics by men and women of various ethnic, racial, and cultural groups; equity considerations in mathematics education; variations in how students learn mathematics; diverse methods of communication and assessment in mathematics; and practical aspects of teaching diverse students. Students will be required to do some tutoring in mathematics. This course does not count toward the minor in mathematics or toward the upper division mathematics electives of the mathematics major (even for the secondary education emphasis).

MATH 310 | APPLIED MATHEMATICS FOR SCIENCE AND ENGINEERING I
Units: 3 Repeatability: No
Prerequisites: MATH 151
Matrix algebra, ordinary differential equations, and operational techniques. Students may not receive credit for both MATH 310 and MATH 330 (mutually exclusive).

MATH 311 | APPLIED MATHEMATICS FOR SCIENCE AND ENGINEERING II
Units: 3-4
Prerequisites: MATH 250 and MATH 310
Boundary value problems, partial differential equations, Fourier methods, and introduction to complex analysis. Prereq: MATH 250 and 310. Students may not take MATH 311 concurrently with MATH 331 or after having taken MATH 331.

MATH 315 | APPLIED PROBABILITY AND STATISTICS
Units: 3
Prerequisites: MATH 250
Introduction to probability; discrete and continuous random variables; conditional and joint distributions and densities; functions of random variables; expectation and estimation; central limit theorem; introduction to statistics; introduction to random sequences and random processes.

MATH 320 | LINEAR ALGEBRA
Units: 3-4
Prerequisites: MATH 151
Systems of linear equations, matrix algebra and operations, vector spaces of three or more dimensions, linear independence, inner product spaces, linear transformations and their matrices, determinants, eigenvalues and eigenvectors, and brief introduction to canonical forms. Prereq: MATH 151 with a grade of C- or better. It is recommended that students take MATH 160 before taking MATH 320.

MATH 325W | HISTORY OF MATHEMATICS
Units: 3
Core Attributes: Writing-Pre F17 CORE
Prerequisites: MATH 250
Selected topics from the history of mathematics. The course includes a variety of writing assignments. Emphasis is on the history of mathematical ideas, rather than on personalities or social background. Prereq: MATH 250 with a grade of C- or better.

MATH 330 | ORDINARY DIFFERENTIAL EQUATIONS
Units: 3
Prerequisites: MATH 250
Preliminary ideas, differential equations of the first and second order, linear equations with constant coefficients, operational techniques, simultaneous equations, series solutions, and applications. Prereq: MATH 250 with a grade of C- or better.

MATH 331 | PARTIAL DIFFERENTIAL EQUATIONS
Units: 3
Prerequisites: MATH 330
Preliminary notions, techniques for solving well-known partial differential equations of physics, orthogonal functions, and applications. Prereq: MATH 330 with a grade of C- or better.

MATH 340 | NUMERICAL ANALYSIS I
Units: 3
Prerequisites: MATH 151 and COMP 150
Approximate computations and round-off errors, Taylor expansions, numerical solution of equations and systems of equations, numerical integration, numerical solution of differential equations, interpolation, and problem solving on the computer. Prereq: MATH 151 with a grade of C- or better and COMP 150 with a grade of C- or better. Cross-listed as COMP 340.

MATH 341 | NUMERICAL ANALYSIS II
Units: 3
Prerequisites: MATH 250 and MATH 320 and MATH 330 (Can be taken Concurrently) and MATH 340
Estimation of eigenvalues and eigenvectors of matrices; numerical solutions of differential equations, existence, and stability theory; and computer lab assignments. Prereq: MATH 250, 320, 330 (may be taken concurrently), and 340, all with a grade of C- or better. Cross-listed as COMP 341.

MATH 350 | PROBABILITY
Units: 3
Prerequisites: MATH 250
Probability axioms, conditional probability, discrete and continuous sample spaces, random variables and common distributions, jointly distributed random variables, and central limit theorem.

MATH 351 | MATHEMATICAL STATISTICS
Units: 3
Prerequisites: MATH 350
Statistical models, estimation, hypothesis testing, optimality, linear models, analysis of discrete data, and nonparametric methods. Prereq: MATH 350 with a grade of C- or better.

MATH 355 | COMBINATORICS
Units: 3
Prerequisites: MATH 151 and MATH 160
Principles of enumeration, finite difference calculus, generating functions, finite difference equations, principle of Inclusion and Exclusion, introduction to the theory of combinatorial graphs, and applications to computer science. Prereq: MATH 151 with a grade of C- or better and MATH 160 with a grade of C- or better.

MATH 360 | REAL ANALYSIS I
Units: 3
Prerequisites: MATH 160 and MATH 250
A study of the foundations of real analysis, including the calculus of functions of one and several variables, infinite processes, convergence theory, and selected topics of advanced undergraduate analysis. Prereq: MATH 160 with a grade of C- or better and MATH 250 with a grade of C- or better.

MATH 361 | REAL ANALYSIS II
Units: 3
Prerequisites: MATH 360
A study of the foundations of real analysis, including the calculus of functions of one and several variables, infinite processes, convergence theory, and selected topics of advanced undergraduate analysis. Prereq: MATH 360 with a grade of C- or better.
MATH 365 | COMPLEX FUNCTION THEORY
Units: 3
Prerequisites: MATH 160 and MATH 250
Analytic function theory; power series, analytic continuation, conformal mapping, and applications. Prereq: MATH 160 with a grade of C- or better and MATH 250 with a grade of C- or better.

MATH 370 | THEORY OF NUMBERS
Units: 3
Prerequisites: MATH 151 and MATH 160
Divisibility, Euclidean algorithm, fundamental theorem of arithmetic, congruences, Fermat’s theorem, Euler’s function, Chinese Remainder Theorem, Diophantine equations, primitive roots, quadratic residues, reciprocity law, and continued fractions. Prereq: MATH 160 with a grade of C- or better and MATH 151 with a grade of C- or better.

MATH 375 | ALGEBRAIC SYSTEMS
Units: 3
Prerequisites: MATH 151 and MATH 160
An introduction to groups, rings, integral domains, division rings, fields, vector spaces, and algebras, and applications of these systems to other branches of mathematics. Prereq: MATH 160 with a grade of C- or better and MATH 151 with a grade of C- or better.

MATH 380 | GEOMETRY
Units: 3
Prerequisites: MATH 160 and MATH 250
An introduction to an area of modern geometry. The specific topic will be chosen from the following: non-Euclidean geometry, differential geometry, projective geometry, or metric geometry, and historical references. Prereq: MATH 160 with a grade of C- or better and MATH 250 with a grade of C- or better.

MATH 385 | TOPOLOGY
Units: 3
Prerequisites: MATH 160 and MATH 250
Metric spaces, topologies, subspaces, continuity, separation axioms, compactness, and connectedness. Prereq: MATH 160 with a grade of C- or better and MATH 250 with a grade of C- or better.

MATH 388 | MATHEMATICAL LOGIC
Units: 3
Prerequisites: MATH 160 and MATH 151
Abstract structure of logical arguments, theory of the propositional and predicate calculus, and selected topics in modern logic. Prereq: MATH 160 with a grade of C- or better and MATH 151 with a grade of C- or better.

MATH 389 | MATHEMATICAL PROBLEM SOLVING SEMINAR
Units: 1 Repeatability: Yes (Can be repeated for Credit)
Prerequisites: MATH 151
This course is intended for students who enjoy the challenge of mathematical problems. This course differs from other mathematics courses which are focused on the theory and applications of a single branch of mathematics. It emphasizes problem-solving techniques, creative thinking, and exposition of skills in different areas of mathematics such as algebra, calculus, geometry, and number theory. (May be taken twice for credit.).

MATH 405 | ADVANCED PERSPECTIVE ON HIGH SCHOOL MATHEMATICS
Units: 3
This course is a required course in the Mathematics Single Subject credential program. It provides a capstone experience for future mathematics high school teachers, in which they look at topics in high school mathematics from an advanced viewpoint. Connections between mathematics topics and between basic and more advanced mathematics will be emphasized. This course does not count toward the minor in mathematics or toward the upper division mathematics electives of the mathematics major (even for the secondary education emphasis).

MATH 444 | FORUM
Units: 3 Repeatability: No
Core Attributes: Advanced writing competency, Oral communication competency
Prerequisites: MATH 355 (Can be taken Concurrently) or MATH 360 (Can be taken Concurrently) or MATH 365 (Can be taken Concurrently) or MATH 370 (Can be taken Concurrently) or MATH 375 (Can be taken Concurrently) or MATH 380 (Can be taken Concurrently) or MATH 385 (Can be taken Concurrently)
The goal of this capstone mathematics course is to improve the ability to communicate mathematics, both written and oral, to a general and technical audience. In the process, students are exposed to a broad range of topics from modern and classical mathematics, and increase their familiarity with the culture of mathematics. This course fulfills the upper division writing and oral communication requirements.

MATH 445 | MATHEMATICAL MODELING
Units: 3
Prerequisites: MATH 250 and MATH 320 and MATH 330
The construction and analysis of mathematical models, simplifying assumptions and testing strategies; topics chosen by the instructor in dimensional analysis, discrete and continuous dynamical systems, stochastic models, linear systems, optimization models, statistical methods, and graph theory. Prereq: MATH 250 with a grade of C- or better, MATH 320 with a grade of C- or better and MATH 330 with a grade of C- or better.

MATH 494 | SPECIAL TOPICS
Units: 1-4 Repeatability: Yes (Can be repeated for Credit)
Prerequisites: MATH 250
Topics of special interest chosen by the instructor. May be repeated for credit with the consent of the instructor.

MATH 495W | SENIOR PROJECT A
Units: 1 Repeatability: No
Core Attributes: Writing-Pre F17 CORE
Prerequisites: MATH 250 and MATH 320
Capstone senior project involving the application of mathematics to the solution of a problem or problems. Meets once per week: prepare a written research proposal for work to be carried out in MATH 496W; ongoing written and oral progress reports and regular consultation with the faculty supervisor.

MATH 496W | SENIOR PROJECT B
Units: 2
Core Attributes: Writing-Pre F17 CORE
Prerequisites: MATH 495W
Capstone senior project involving the application of mathematics to the solution of a problem or problems. Meets twice per week: carry out the project defined in MATH 495W; ongoing written and oral progress reports and regular consultation with the faculty supervisor; final written and oral presentation in the presence of other students and faculty. Prereq: MATH 495W with a grade of C- or better.

MATH 498 | INTERNSHIP
Units: 1-3 Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Law - Experiential
Practical experience in the application of mathematics. Students will be involved in projects conducted by businesses, agencies, and institutions. Enrollment is arranged on an individual basis according to the student’s interest and background, and the availability of positions. A written report is required. Units may not normally be applied toward the major or minor in mathematics.

MATH 499 | SENIOR PROJECT C
Units: 1-4 Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Writing-Pre F17 CORE
Practical experience in the application of mathematics. Students will be involved in projects conducted by businesses, agencies, and institutions. Enrollment is arranged on an individual basis according to the student’s interest and background, and the availability of positions. A written report is required. Units may not normally be applied toward the major or minor in mathematics.

MATH 499W | INTERNSHIP
Units: 1-3 Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Law - Experiential
Practical experience in the application of mathematics. Students will be involved in projects conducted by businesses, agencies, and institutions. Enrollment is arranged on an individual basis according to the student’s interest and background, and the availability of positions. A written report is required. Units may not normally be applied toward the major or minor in mathematics.

MATH 499W | INTERNSHIP
Units: 1-3 Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Law - Experiential
Practical experience in the application of mathematics. Students will be involved in projects conducted by businesses, agencies, and institutions. Enrollment is arranged on an individual basis according to the student’s interest and background, and the availability of positions. A written report is required. Units may not normally be applied toward the major or minor in mathematics.

MATH 499W | INTERNSHIP
Units: 1-3 Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Law - Experiential
Practical experience in the application of mathematics. Students will be involved in projects conducted by businesses, agencies, and institutions. Enrollment is arranged on an individual basis according to the student’s interest and background, and the availability of positions. A written report is required. Units may not normally be applied toward the major or minor in mathematics.
MATH 499 | INDEPENDENT STUDY
Units: 1-3  Repeatability: Yes (Can be repeated for Credit)
Core Attributes: Law - Experiential
Student reading and research in selected special topics; student presentations. May be repeated for credit once with a different topic.