B.A. IN MATHEMATICS

Code	Title	Credits
Major in Mathematics (B.A.)		
MAT 124M	Calculus 1	4
MAT 125	Calculus 2	4
MAT 211	Linear Algebra	3
MAT 222	Differential Equations	3
MAT 223	Multivariable Calculus	3
MAT 241	Discrete Mathematics	3
MAT 310	Algebraic Structures	4
MAT 330	Probability and Statistics	3
MAT 422	Real Analysis	3
MAT 425	Topics in Mathematics	3
MAT 499	Foundations of Mathematics	3
COS 100	Introduction to Programming	3
COS 105	Computer Science 1	4
Choose two of the following Applied Math course:		6-7
MAT 331	Applied Statistics	
MAT 344	Numerical Methods	
MAT 376	Operations Research	

Code	Title	Credits
Major *		49-50
General Education		49-50
Electives		22-24
Total Credits		122

* Courses whose number is followed by a letter fulfill a General Education requirement.

MAT 101M • Mathematics for the 21st Century. 3 Credits.
Mathematical ideas that a liberally educated person should be familiar with in order to function well in a technological society.
Prerequisites: Two years of high school algebra, including logarithms and exponential functions. Offered: Fall, spring

MAT 102M • Creative Problem Solving. 3 Credits.
An opportunity to learn to use creative thinking and intuition to gain confidence in understanding and solving some intriguing problems in mathematics.
Prerequisites: High school algebra and geometry. Offered: Interim

MAT 123M • Precalculus. 3 Credits.
Mathematics topics required for MAT 124M or for further study in the natural sciences. Equations and inequalities; graphs of functions and relations; polynomial, rational, exponential, logarithmic functions; trigonometric functions, identities, equations, and applications.
Prerequisites: Two years of high school algebra; satisfy math department placement requirements. Offered: Fall, spring

MAT 124M • Calculus 1. 4 Credits.
A mathematical foundation for future college courses and beyond. An introduction to the concepts and methods of the derivative and the integral, and a demonstration of how they are applied in real-world modeling situations. Topics are examined graphically, numerically, and algebraically, including using a symbolic computer algebra system to aid with understanding.
Prerequisites: MAT 123M or equivalent high school or college course(s); satisfy math department placement requirements. Offered: Fall, spring

MAT 125 • Calculus 2. 4 Credits.
A continuation of the equipping of students with tools for effective problem solving. Study of integration, sequences and series, and introduction to differential equations and approximation techniques. Each topic is approached from several viewpoints (graphical, numerical, algebraic) to involve students with different learning styles.
Prerequisites: MAT 124M. Offered: Fall, spring

MAT 201M • Mathematics for Elementary Education 1. 3 Credits.
Introduction to problem solving; patterns and sequences; systems of numeration; sets and logic; concepts, operations, and algorithms for each subset of the real numbers; elementary number theory; concepts and applications of ratios, proportions, and percents.
Prerequisites: Major in Elementary Education; minimum ACT mathematics score of 24, minimum SAT mathematics score of 560, or satisfactory completion of Bethel's online Math for Elementary Education prep course. Special Notes: MAT 201M may not be used to fulfill the requirements for a major or minor in Mathematics; Offered: Fall, Spring.

MAT 202 • Mathematics for Elementary Education 2. 3 Credits.
Problem-solving and reasoning strategies; algebraic expressions, equations, and functions; data analysis, statistics, combinations/permutations, and probability; concepts and applications of two- and three-dimensional geometry and measurement.
Prerequisites: Grade of C or higher in MAT 201M. MAT 202 may not be used to fulfill the requirements for a major or minor in mathematics. Offered: Fall, spring

MAT 207M • Statistical Analysis. 3 Credits.
Descriptive and inferential statistics. Specific topics include discrete probability spaces, random variables, distributions, normal distribution, estimation, hypothesis testing, linear regression, correlation analysis. Selected topics could include analysis of variance, goodness-of-fit, and contingency tables. Applications to business, economics, and science.
Offered: Fall, Interim, Spring. Special Notes: Students may not receive credit for both MAT 207M and PSY 230M.

MAT 209 • Financial Mathematics for Actuarial Science. 3 Credits.
Topics and problem-solving practice for the actuarial exam in financial mathematics. Theory of interest topics include: time value of money, annuities, cash flows, amortized loans, bonds, portfolios, and immunization. Financial economics topics include: derivatives, options, forwards and futures, swaps, hedging, and investment strategies.
Prerequisites: MAT 125. Offered: Occasionally.

MAT 211 • Linear Algebra. 3 Credits.
Linear systems, matrices, vectors and vector spaces, linear transformations, inner products, norms, eigenvalues and eigenvectors, orthogonality, and applications. Provides a foundation for many areas of study in mathematics, computer science, engineering, and science.
Prerequisites: MAT 125 or MAT 241. Offered: Fall, spring.

MAT 222 • Differential Equations. 3 Credits.
Analytic solution methods for ordinary differential equations, including special methods for first- and second-order systems, and transformation methods. Analysis of systems of differential equations using linear algebra and qualitative phase plane techniques.
Prerequisites: MAT 125. MAT 223 strongly recommended. Offered: Spring

MAT 223 • Multivariable Calculus. 3 Credits.
Differential calculus of real functions on R^n: limits, continuity, partial and directional derivatives, mean value theorem, implicit functions, Taylor's Theorem, and optimization techniques (including Lagrange multipliers). Multiple integral theory: change of variables, iterated integrals, and line integration (Green's Theorem).
Prerequisites: MAT 125. Offered: Fall, Spring.

MAT 241 • Discrete Mathematics. 3 Credits.
Covers a collection of topics useful to mathematics and computer science majors. The unifying factor is that the topics deal mainly with finite collections of mathematical objects (graphs, trees, finite state machines, etc.). Also includes examination of sets, logic, Boolean algebras, proof techniques, algorithm analysis, counting, and recursion.
Prerequisites: MAT 124M. Offered: Fall

MAT 310 • Algebraic Structures. 4 Credits.
Study of groups, rings, fields, and applications of these algebraic structures from a firm axiomatic foundation with a strong emphasis on properly written proofs.
Prerequisites: MAT 211. Offered: Spring

MAT 330 • Probability and Statistics. 3 Credits.
Discrete and continuous probability spaces, distribution and density functions, random variables, sampling, expectation, estimation, and hypothesis testing.
Prerequisites: MAT 125. Offered: Fall

MAT 331 • Applied Statistics. 3 Credits.
Linear and multilinear regression. Factor analysis, including analysis of variance and experimental design.
Prerequisites: MAT 330 or consent of instructor. Offered: Spring, even # years

MAT 344 • Numerical Methods. 3 Credits.
Numerical methods for solving systems of linear equations, finding roots and fixed points, approximating data and functions, numerical integration, finding solutions to differential equations.
Prerequisites: MAT 211 or MAT 222. Recommended: COS 105 or COS 205. Offered: Spring. Special Notes: Carries cross-credit in computer science.

MAT 351 • Modern Geometry. 3 Credits.
A survey of informal and formal geometric topics. Investigation of concepts, structure, proof, Euclidean, non-Euclidean, and transformational geometry.
Prerequisites: MAT 241 or consent of instructor. Offered: Fall, even # years. Special Notes: Designed for students seeking licensure to teach math in grades 5-12.

MAT 376 • Operations Research. 4 Credits.
Mathematical techniques used in systems analysis, including linear programming, simulation techniques, and other topics such as transportation models, integer programming, and network analysis.
Prerequisites: COS 105 or COS 205; MAT 211. Offered: Fall, odd # years.

MAT 422 • Real Analysis. 3 Credits.
Elementary set theory, properties of real numbers, functions of real variables, sequences, series, differentiation, Riemann integration, and introduction to topological concepts.
Prerequisites: MAT 223; MAT 310. Offered: Fall.

MAT 425 • Topics in Mathematics. 3 Credits.
A seminar designed to provide an in-depth experience with a specific field of mathematics. Topics vary from semester to semester and include logic, number theory, dynamical systems, chaos and fractals, complex analysis, partial differential equations and Fourier analysis, intermediate probability and statistics, combinatorics, and topology.
Corequisites: MAT 310 or consent of instructor. Offered: Spring, odd # years.

MAT 499 • Foundations of Mathematics. 3 Credits.
A short history of mathematics' major transition points, overview of foundations of mathematics, axiomatic structures, and philosophies of mathematics in relation to Christian faith.
Prerequisites: Major in mathematics; Senior standing.
Offered: Interim.