

# COURSES

## VETERINARY NURSING

- MA076 Beginning Algebra 3.0 UNITS**  
Algebra is a foundational skill for exploring the physical world and predicting real like events. The goal of the Beginning Algebra and Intermediate Algebra series is to teach you the basic essentials of algebra needed to succeed in future math and science classes. This series prepares you for College Algebra, a course that is required to succeed in most science and technology classes. Beginning Algebra covers the first half of the essential algebra topics needed to continue into more advanced courses. The second half of these topics is covered in Intermediate Algebra (MA 177). THIS COURSE DOES NOT SATISFY A GRADUATION REQUIREMENT.
- MA109 Math for Veterinary Nurses 2.0 UNITS**  
Prerequisite: ACT math score of 14 or above or equivalent. This course will enable you to improve your understanding of fractions, decimals, percents, ratios and proportions, and systems of measure. This course will enable you to accurately determine solutions, medications, and dosage in a clinical setting.
- MA169 Survey of Mathematics 3.0 UNITS**  
You will learn to solve the fundamental operations on the set of real numbers, the basic concepts of elementary algebra, mathematical formulas, metric measure, geometry, and consumer interest problems.
- MA177 Intermediate Algebra 3.0 UNITS**  
Prerequisite: Either "C" or above in MA076/Beginning Algebra or a high enough score on testing determined by the Mandatory Placement Guide. Algebra is a foundational skill for exploring the physical world and predicting real events. The goal of the Beginning Algebra and Intermediate Algebra series is to teach you the essentials of algebra needed to succeed in future math and science classes. Topics include properties of real numbers, linear and quadratic equations, absolute value equations and inequalities, systems of linear equations and inequalities, operations on polynomials and factoring, operations on rational equations, graphs of functions, integer and rational exponents, and radicals. Intermediate Algebra covers the second half of the essential algebra topics needed to continue into more advanced courses. The first half of these topics is covered in Beginning Algebra (MA076).
- MA178 College Algebra 3.0 UNITS**  
Prerequisite: MA177/Intermediate Algebra with a grade of "C" or better or high enough score on testing determined by the Mandatory Placement Guide. Algebra is a foundational skill for exploring the physical world and predicting real events. This is a foundational course needed to understand most science, technology, education, and mathematics courses, both at Colby Community College and other schools. Regardless of your major, you will learn real-life skills such as understanding compound interest, which is used in auto loans, home mortgages, and retirement accounts. Topics include solving equations, sketching graphs, and solving inequalities for linear, quadratic, polynomial, rational, logarithmic, exponential, and absolute value functions. Transformations of graphs, symmetries, function arithmetic, and complex numbers. If time permits systems of inequalities and systems of equations, including matrices will be explored.
- MA185 Plane Trigonometry 3.0 UNITS**  
Prerequisite: MA178/College Algebra with a grade of "C" or better or the equivalent. In your career, you will encounter many problems that will have a repeating pattern. Trigonometry is designed to handle these problems and you will also see it used in the design and measure of large-scale constructions and physical phenomenon. Topics include unit circle and right triangle properties, identities, trigonometric functions, trigonometric inverses, solving equations, graphing, solving triangles, polar coordinates, and complex numbers. This course, along with College Algebra, prepares you for understanding the ideas of Calculus.
- MA190 Pre-Calculus 3.0 UNITS**  
Prerequisite: MA178/College Algebra with a grade of "C" or better or the equivalent. Pre-Calculus reviews the topics of College Algebra and Trigonometry in preparation for the Analytical Geometry & Calculus series. Topics include linear, quadratic, absolute value, and rational equations and inequalities; polynomial, rational, exponential, and logarithmic functions; complex numbers; linear and non-linear systems of equations and inequalities; unit circle and right triangle trigonometry; law of sines and cosines; graphs of trigonometric functions; and verifying trigonometric identities. This is an accelerated course with a fast pace and heavy workload.
- MA205 Elements of Statistics 3.0 UNITS**  
Prerequisite: MA178/College Algebra with a grade of "C" or better or the equivalent. Statistics and data science predict and explain almost all aspects of our society. You will learn how political polls, medical studies, and scientific experiments are designed, analyzed, and verified. You will also learn how to spot common statistical and logical errors and how to prevent them. Additionally, you will learn the ideas used to build games of chance such as poker, blackjack, and lotteries. Topics include sampling and blocking methods, measures of center and variation, data plots (scatterplot, histograms, bar plots, time series, ...), probability, probability distributions (binomial, geometric, normal,...), Central Limit Theorem, confidence intervals, hypothesis testing for means and proportion, correlation, and regression.
- MA210 Calculus: for Business & Liberal Arts 3.0 UNITS**  
Prerequisite: MA178/College Algebra with a grade of "C" or better or the equivalent. Calculus is used to predict and explain many business, economic, and social changes in both the future and the past. You will learn techniques for analyzing cost and profit as well as the study of growth and decline in populations. Topics include limits, derivatives, and integration applied to business and the sciences. This course does not include any topics from Trigonometry and will not prepare you for Analytical Geometry & Calculus II (MA230).
- MA220 Analytical Geometry & Calculus I 5.0 UNITS**  
Prerequisite or Co-requisite: MA178/College Algebra and MA122/Plane Trigonometry or equivalent. Calculus is used to model and predict the way physical phenomena change over time. You will use the ideas of Calculus to understand and fully participate in the scientific and engineering communities. In this course, you will learn how to use limits, derivatives, and integrals. Extensive examples from the physical sciences are explored through the lens of Calculus, such as radioactive decay and rates of change. An early transcendentals approach is used. Topics include limits, limit laws, derivatives, derivative rules (sum, product, quotient, chain rule, ...), implicit differentiation, hyperbolic functions, mean-value theorem, definite integration, fundamental theorem of calculus, introductory integration method including the substitution method, application of definite integrals including area, volume, and average values. The Calculus series is continued in Analytical Geometry & Calculus II (MA230).
- MA230 Analytical Geometry & Calculus II 5.0 UNITS**  
Prerequisite: MA185/Plane Trigonometry and MA220/Analytical Geometry & Calculus I. Calculus is used to model and predict the way physical phenomena change over time. You will use the ideas of Calculus to understand and fully participate in the scientific and engineering communities. In this course, you will learn how to use integration and series. Extensive examples from the physical sciences are explored through the lens of Calculus such as hydrostatic forces,

properties of complex geometric shapes, and estimating quantities that are difficult or impossible to calculate exactly. An early transcendentals approach is used. Topics include advanced integration methods (integration by parts, trigonometric substitutions, partial fraction decomposition,...), improper integrals, applications of integration (arc length, surface area, hydrostatic pressure, center of mass,...), differential equations, parametric equations, polar coordinates, sequences, series, and Taylor series. The Calculus series is continued in Analytical Geometry & Calculus III (MA240).

### **MA240 Analytical Geometry & Calculus III**

**5.0 UNITS**

Prerequisite: MA 230/Analytical Geometry & Calculus II. Calculus is used to model and predict the way physical phenomena change over time. You will use the ideas of Calculus to understand and fully participate in the scientific and engineering communities. In this course, you will use the ideas from previous Calculus courses to explore similar topics in higher dimensional contexts. Extensive examples from the physical sciences are explored through the lens of Calculus such as three-dimensional motion, magnetic fields, and volumes of complex shapes. Topics include vector dot and cross product applications, vector and non-vector representation of curves and surfaces in three dimensions, derivatives and integrals of vector functions, applications of vector functions in arc length/curvature/velocity/acceleration, limits and continuity in functions of several variables, partial derivatives, tangent planes, chain rule, directional derivatives, gradients, optimizations, Lagrange multipliers, multiple integrals, applications of multiple integrals including surface area/volume/center of mass, change of variables in multiple integration, line integrals, curl, divergence, Green's Theorem, surface integrals, Stoke's Theorem, and the Divergence Theorem.

### **MA245 Differential Equations**

**3.0 UNITS**

Prerequisite: MA240/Analytical Geometry & Calculus III. Differential equations explore how to calculate a model based on how a phenomenon is changing over time. You will expand on the ideas from Calculus to model complex systems such as fluid motion, population growth, radioactive decay, and harmonic motion. Topics include direction fields, separation of variables, first-order linear differential equations, Euler's method, some special higher order differential equations, Laplace transforms, and applications from physics and engineering including population models, Newton's law of cooling, and harmonic motion. If time permits, some introductory Linear Algebra (matrices, vector spaces, linear functions, Eigen values and vectors, ...) topics are covered to discuss solving systems of differential equations and higher order linear differential equations. These topics are not a replacement for a Linear Algebra course.