MATHEMATICS (MATH)

This is a list of the Mathematics (MATH) courses available at Kwantlen.

MATH 1112 CR-3
Pre-Calculus Algebra
Students will study the concept of function in depth. In particular they will study polynomial, rational, exponential, logarithmic and trigonometric functions, and their graphs.

Prerequisites: (MATQ 1093 or MATH 1117) or (ABEM 0011 or MATP 1011 or MATQ 1099 with a B-) or Pre-calculus 12 with a C; or Principles of Mathematics 12 with a C; or Pre-calculus 11 with a B; or Principles of Mathematics 11 with a B; or Pre-calculus 11 with a C plus Mathematics Placement Test; or Principles of Mathematics 11 with a C plus Mathematics Placement Test; or Pre-calculus 12 with a P plus Mathematics Placement Test; or Principles of Mathematics 12 with a P plus Mathematics Placement Test; or Applications of Mathematics 12 with a C plus Mathematics Placement Test; or Applications of Mathematics 11 with a C plus Mathematics Placement Test
Transferable (refer to transfer guide)

MATH 1115 CR-3
Statistics I
Students will summarize and display data and perform inferences about proportions, means and standard deviations for one and two populations. They will also perform regression analysis, and determine probabilities.

Prerequisites: MATQ 1093 or MATH 1117 or (ABEM 0011 or MATP 1011 or MATQ 1099 with a B-); or Pre-calculus 12 with a C; or Principles of Mathematics 12 with a C; or Pre-calculus 11 with a B; or Principles of Mathematics 11 with a B; or Pre-calculus 11 with a C plus Mathematics Placement Test; or Principles of Mathematics 11 with a C plus Mathematics Placement Test; or Pre-calculus 12 with a P plus Mathematics Placement Test; or Principles of Mathematics 12 with a P plus Mathematics Placement Test; or Foundations of Math 12 with a C; or Foundations of Math 11 with a B; or Applications of Mathematics 12 with a C plus Mathematics Placement Test; or Applications of Mathematics 11 with a C plus Mathematics Placement Test
Transferable (refer to transfer guide)

MATH 1116 CR-3
Mathematical Explorations
Students will study the structure and development of Mathematics from the point of view of the non-mathematician. They will study historical material on the development of classical mathematical ideas as well as the evolution and structure of more recent mathematics, gaining an appreciation of historical and contemporary mathematical thinking.

This is an exploratory course in mathematics for students who have minimal mathematical background and whose major interests lie outside of the sciences. This course can be used to partially fulfill the quantitative requirement of the BA degree. It may not be used as a prerequisite for further Mathematics courses.

Prerequisites: MATQ 1093 or MATH 1117 or (ABEM 0011 or MATP 1011 or MATQ 1099 with a B-) or Principles of Mathematics 11 with a C or Applications of Mathematics 11 with a C; or Pre-calculus 11 with a C or Foundations of Math 11 with a C
Transferable (refer to transfer guide)

MATH 1117 CR-3
Environmental Mathematics
Students will study algebraic concepts and methods, making use of them in general and environmental problem solving. They will study basic geometry and trigonometry, as well as functions (polynomial, rational, exponential, and logarithmic).

Prerequisites: MATQ 1092 or ABEM 0010 or MATP 1010; or Pre-calculus 12 with a P; or Principles of Mathematics 12 with a P; or Pre-calculus 11 with a C; or Principles of Mathematics 11 with a C; or Applications of Mathematics 12 with a C; or Foundations of Math 11 with a C+; or Mathematics Placement Test
Transferable (refer to transfer guide)

MATH 1120 CR-3
Differential Calculus
Students will learn to differentiate algebraic and elementary transcendental functions and to apply these skills to graphing, maxima and minima, related rates, and rectilinear motion. They will be introduced to parametric curves and their differential calculus

Prerequisites: MATH 1112 or Pre-calculus 12 with a B; or Principles of Mathematics 12 with a B; or Pre-calculus 12 with a C plus Mathematics Placement Test; or Principles of Mathematics 12 with a C plus Mathematics Placement Test
Transferable (refer to transfer guide)

In the event of a discrepency between this document and the official Kwantlen 2011-12 Calendar (available at www.kwantlen.ca/calendar/2011-12), the official calendar shall be deemed correct.

2011-12 Calendar

www.kwantlen.ca/calendar/2011-12

MATH 1130 CR-3
Calculus for Life Sciences I
Students will study differential calculus and its applications to biological sciences. In particular, they will study limits and differentiation of algebraic and elementary transcendental functions, with applications to graphing, optimization, and growth and decay.

Prerequisites: MATH 1112 or Pre-calculus 12 with a C+; or Principles of Mathematics 12 with a C+; or Pre-calculus 12 with a C plus Mathematics Placement Test; or Principles of Mathematics 12 with a C plus Mathematics Placement Test
Transferable (refer to transfer guide)

MATH 1135 CR-3
Problems and Concepts
Students will develop skills in solving mathematical problems. They will study propositional and quantifier logic and apply this knowledge to solving problems and to elementary set theory, including relations and functions.

Prerequisites: Pre-calculus 11 with a B; or Principles of Mathematics 11 with a B; or Pre-calculus 12 with a C; or Principles of Mathematics 12 with a C
Co-requisites: MATH 1112 (not required if you have Pre-calculus 12 with a C+ or Principles of Mathematics 12 with a C+) MATH 1112 (not required if you have Pre-calculus 12 with a C+ or Principles of Mathematics 12 with a C+)
Transferable (refer to transfer guide)

MATH 1140 CR-3
Calculus I (Business Applications)
Students will study the differentiation of algebraic and elementary transcendental functions and apply these skills to graphing, finding maxima and minima and solving problems in business, economics and social sciences. Students will also study first and second order partial derivatives

Prerequisites: MATH 1112 or Pre-calculus 12 with a C+; or Principles of Mathematics 12 with a C+; or Pre-calculus 12 with a C plus Mathematics Placement Test; or Principles of Mathematics 12 with a C plus Placement Test
Transferable (refer to transfer guide)

MATH 1152 CR-3
Matrix Algebra for Engineers
Students will solve systems of linear equations, and study the algebra of matrices, determinants, invertibility, eigenvalues and eigenvectors, diagonalizability and systems of linear Ordinary Differential Equations (ODE's). They will study the geometry of Euclidean space, dot and cross products, the arithmetic of complex numbers, exponentials and logarithms of complex numbers, and the complex plane. Students will use a Computer Algebra System to solve problems in matrix algebra.

Prerequisites: (MATH 1120 or MATH 1130 with a C+) or (MATH 1140 with a B-) or MATH 1230 or MATH 1240
Transferable (refer to transfer guide)

MATH 1190 CR-4
Mathematics for Elementary School Teachers
Students will study the theory and applications of arithmetic, geometry and data analysis (statistics). This course is designed for students planning a career as an elementary school teacher.

Prerequisites: Students who satisfy either (1) or (2) below are eligible to take MATH 1190.(1) MATH 1112 or Pre-calculus 12 with a C+; or Principles of Mathematics 12 with a C+ ; or Pre-calculus 12 with a C plus Mathematics Placement Test; or Principles of Mathematics 12 with a C plus Mathematics Placement Test OR (2) 18 Kwantlen Polytechnic University credits numbered 1100 or higher (or equivalent), or any university degree that is recognized by Kwantlen Polytechnic University, plus [MATQ 1093 or MATH 1115 or 1116 or 1117; or (MATP 1011 or ABEM 0011 or MATQ 1099 with a B-); or Pre-calculus 12 with a C; or Principles of Mathematics 12 with a C; or Pre-calculus 12 with a P plus Mathematics Placement Test; or Principles of Mathematics 12 with a P plus Mathematics Placement Test; or Pre-calculus 11 with a B; or Principles of Mathematics 11with a B; or Pre-calculus 11 with a C plus Mathematics Placement Test; or Principles of Mathematics 11 with a C plus Mathematics Placement Test; or Foundations of Math 12 with a C; or Foundations of Math 11 with a B]
Transferable (refer to transfer guide)

MATH 1220 CR-3
Integral Calculus
Students will learn to integrate algebraic and elementary transcendental functions and to apply these skills to appropriate problems. In addition, they will learn the fundamental theorem of calculus, the integral calculus of parametric curves, Taylor polynomials, sequences and series and simple differential equations.

Prerequisites: MATH 1120 or MATH 1130 with C + or better or MATH 1140 with a B- or better
Transferable (refer to transfer guide)

MATH 1230 CR-3
Calculus for Life Sciences II
Students will study integral calculus and its applications to biological sciences. In particular, they will study the indefinite and definite integral, functions of several variables, differential equations, and probability theory, with applications to biological problems.

Prerequisites: MATH 1140 with a C+ or better or MATH 1120 or MATH 1130
Transferable (refer to transfer guide)

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MATH 1240 CR-3
Calculus II (Business Applications)
Students will study the integration of algebraic and elementary transcendental functions and apply these skills to solving problems in business, economics and social sciences. They will also study multivariate differential calculus, differential equations, matrix algebra and linear programming.

Prerequisites: MATH 1120 or MATH 1130 or MATH 1140
Transferable (refer to transfer guide)

MATH 2232 CR-3
Linear Algebra
Students will study systems of linear equations, matrices, determinants, eigenvalues and eigenvectors, dot products, the Gram-Schmidt process, vector and scalar projections, lines and planes in Euclidean space. Students will also study vector spaces, including general vector spaces and subspaces, linear independence, spanning sets, bases, and linear transformations. Students will write simple proofs.

Prerequisites: MATH 1120 or (MATH 1130 with a C+) or (MATH 1140 with a B-) or MATH 1230 or MATH 1240
Transferable (refer to transfer guide)

MATH 2315 CR-3
Probability and Statistics
Students will study introductory probability and statistics using a background of calculus. Topics include concepts of randomness, probability, probability distributions for discrete and continuous random variables, descriptive statistics, multivariate distributions, laws of expectation, functions of random variables, sampling, statistical inference, and hypothesis testing.

Prerequisites: MATH 1220 or MATH 1230 or MATH 1240
Transferable (refer to transfer guide)

MATH 2321 CR-3
Multivariate Calculus (Calculus III)
Students will study the calculus of three dimensions. They will study surfaces, differentiation, partial derivatives including the Chain Rule, differentials, curves and tangents, optimization including Lagrange Multipliers, double and triple integrals, in polar, cylindrical, spherical and general coordinate systems as well, applications, and use of computer algebra software.

Prerequisites: MATH 1220 or MATH 1230 with a C+ or better or MATH 1240 with a B-
Transferable (refer to transfer guide)

MATH 2331 CR-3
Introduction to Analysis
Students will study the theory that underlies differential and integral calculus. In particular, they will study real numbers, limits of sequences, limits of functions, continuity, and will learn how to construct proofs involving these concepts

Prerequisites: MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)
Transferable (refer to transfer guide)

MATH 2335 CR-3
Statistics for Life Sciences
Students will learn statistical techniques and their application to life sciences. They will study descriptive statistics, elementary probability, random variables, probability distributions, in particular, the binomial, normal, t and chi-square distributions, confidence intervals and hypothesis testing for population means, proportions and variances, as well as for differences in population means and proportions. Students will also study linear regression.

Prerequisites: MATH 1130 or MATH 1120 or MATH 1140
Transferable (refer to transfer guide)

MATH 2341 CR-4
Introduction to Statistics for Business
Students will learn statistical techniques and their application to business and economics. They will study descriptive statistics, elementary probability, random variables, sampling distributions, linear regression, correlation, estimation and hypothesis testing. They will also learn how to apply statistical software to descriptive and inferential statistics. Distributions studied will include binominal, normal, t- and chi-square distributions.

Prerequisites: 15 credits numbered 1100 or higher and MATH 1120 or MATH 1130 or MATH 1140
Transferable (refer to transfer guide)

MATH 3150 CR-3
The Structure of Mathematics
Students will study the underlying structure of mathematics, including mathematical symbolism, introduction to set theory and introduction to logic. They will develop an understanding of methods of proof and an appreciation for the structure of mathematics.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

MATH 3160 CR-3
Group Theory
Students will study the fundamental concepts and results of group theory. They will study groups and subgroups, Lagrange's theorem, homomorphisms, normal subgroups, factor groups, Cauchy's theorem and direct products.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

MATH 3250 CR-3
Geometry
Students will study Euclidean and other geometries, and construct geometrical proofs and objects. They will apply geometric concepts and reasoning to practical problems.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

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MATH 3322 CR-3 (formerly MATH 2322)
Vector Calculus (Calculus IV)
Students will study the calculus of vector valued functions and vector fields. They will study derivatives of vector valued functions, the chain rule, Jacobians and invertibility, differential operators, line integrals and Green's theorem, surface integrals including divergence and Stokes' theorems, path independence and conservative fields and potentials.

Prerequisites: (MATH 2232 or MATH 1152) and MATH 2321
Transferable (refer to transfer guide)

MATH 3421 CR-3 (formerly MATH 2421)
Ordinary Differential Equations
Students will study solving first order differential equations, Laplace transforms, systems of linear differential equations, plane autonomous systems and stability, and applications of differential equations. Students will also use a computer algebra system and graphical methods in studying differential equations.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and (MATH 2232 or 1152)
Transferable (refer to transfer guide)

MATH 3450 CR-3
History of Mathematics
Students will study the aspects of the history of mathematics from its earliest beginnings in solving concrete problems through the development of abstraction and rigour in the nineteenth and early twentieth centuries. They will examine and analyze both the growth of ideas and the context in which they developed, with emphasis on the mathematics taught in secondary school and the first two years of university study.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

MATH 4150 CR-3
Number Theory
Students will study the following topics: divisibility, properties of types of integer numbers, primes, congruences, Diophantine equations, primitive roots, and quadratic residues.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

MATH 4190 CR-3
Introduction to Point-Set Topology
Students will study the fundamental concepts and results of point-set (general) topology. They will study sets, relations and functions, order, cardinality, Axiom of Choice, topological spaces, bases and subbases, continuity and homeomorphisms, metric spaces, countability and compactness.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232 and MATH 2331
Transferable (refer to transfer guide)

MATH 4250 CR-3
Special Topics in Mathematics
Students will study a particular advanced topic in mathematics, depending upon student interest and faculty availability.

Note: Students may take this course multiple times for further credit on different topics.

Prerequisites: [MATH 1220 or (MATH 1230 with a C+) or (MATH 1240 with a B-)] and MATH 2232
Transferable (refer to transfer guide)

MATH 4350 CR-3
Senior Project
Students will complete a substantial research project under the supervision of an instructor. They will identify relevant sources of information, in the form of a literature search and review, and submit a final paper investigating a research question.

Note: The student's topic must be approved by the Mathematics Department.

Prerequisites: 9 MATH credits at the 3000-level or higher
Transferable (refer to transfer guide)