**Summer 2020 Contract Instructor Advertised Courses**

**Summer 2020**

**MATH 1004 [0.5 credit]
Calculus for Engineering or Physics**
Limits. Differentiation of the elementary functions. Rules of differentiation. Inverse trigonometric functions. Applications of differentiation: max-min problems, curve sketching, approximations.Definite and indefinite integrals, techniques of integration. Applications to areas and volumes.

Precludes additional credit for [BIT 1000](https://calendar.carleton.ca/search/?P=BIT%201000), [BIT 1100](https://calendar.carleton.ca/search/?P=BIT%201100), [BIT 1200](https://calendar.carleton.ca/search/?P=BIT%201200), [MATH 1002](https://calendar.carleton.ca/search/?P=MATH%201002), [MATH 1007](https://calendar.carleton.ca/search/?P=MATH%201007), [MATH 1009](https://calendar.carleton.ca/search/?P=MATH%201009).
Prerequisite(s): Ontario Grade 12 Mathematics: Advanced Functions, or [MATH 0005](https://calendar.carleton.ca/search/?P=MATH%200005) and [MATH 0006](https://calendar.carleton.ca/search/?P=MATH%200006), or equivalent. Restricted to students in the Faculty of Engineering, or in certain B.Sc. and B.A.S. programs where specified.
Lectures three hours a week, tutorial one hour a week.

**MATH 1007 [0.5 credit]
Elementary Calculus I**
Limits. Differentiation of the elementary functions, including trigonometric functions. Rules of differentiation. Applications of differentiation: max-min problems, curve sketching, approximations. Introduction to integration: definite and indefinite integrals, areas under curves, fundamental theorem of calculus. Precludes additional credit for BIT 1000, BIT 1100, BIT 1200, [MATH 1002](http://calendar.carleton.ca/search/?P=MATH%201002), [MATH 1004](http://calendar.carleton.ca/search/?P=MATH%201004), [MATH 1009](http://calendar.carleton.ca/search/?P=MATH%201009), [MATH 1401](http://calendar.carleton.ca/search/?P=MATH%201401)/[ECON 1401](http://calendar.carleton.ca/search/?P=ECON%201401), [MATH 1402](http://calendar.carleton.ca/search/?P=MATH%201402)/[ECON 1402](http://calendar.carleton.ca/search/?P=ECON%201402).
Prerequisite(s): Ontario Grade 12 Mathematics: Advanced Functions; or [MATH 0005](http://calendar.carleton.ca/search/?P=MATH%200005) and [MATH 0006](http://calendar.carleton.ca/search/?P=MATH%200006); or equivalent.
Lectures three hours a week, tutorial one hour a week.

**MATH 1104 [0.5 credit]
Linear Algebra for Engineering or Science**
Systems of linear equations. Matrix algebra. Determinants. Invertible matrix theorem. Cramer’s rule. Vector space R^n; subspaces, bases. Eigenvalues, diagonalization. Linear transformations, kernel, range. Complex numbers (including De Moivre’s theorem). Inner product spaces and orthogonality. Applications.

Precludes additional credit for [BIT 1001](https://calendar.carleton.ca/search/?P=BIT%201001), [BIT 1101](https://calendar.carleton.ca/search/?P=BIT%201101), [BIT 1201](https://calendar.carleton.ca/search/?P=BIT%201201), [MATH 1102](https://calendar.carleton.ca/search/?P=MATH%201102), [MATH 1107](https://calendar.carleton.ca/search/?P=MATH%201107), [MATH 1119](https://calendar.carleton.ca/search/?P=MATH%201119), [MATH 1401](https://calendar.carleton.ca/search/?P=MATH%201401)/[ECON 1401](https://calendar.carleton.ca/search/?P=ECON%201401), [MATH 1402](https://calendar.carleton.ca/search/?P=MATH%201402)/[ECON 1402](https://calendar.carleton.ca/search/?P=ECON%201402). Note: [MATH 1119](https://calendar.carleton.ca/search/?P=MATH%201119) is not an acceptable substitute for [MATH 1104](https://calendar.carleton.ca/search/?P=MATH%201104).
Prerequisite(s): Ontario Grade 12 Mathematics: Advanced Functions, or [MATH 0005](https://calendar.carleton.ca/search/?P=MATH%200005), or equivalent, or permission of the School. Restricted to students in the Faculty of Engineering, the School of Computer Science, or in certain B.Sc. and B.A.S. programs where specified. Lectures three hours a week and tutorial one hour a week.

**MATH 2007 [0.5 credit]
Elementary Calculus II**Techniques of integration, improper integrals. Polar coordinates, parametric equations. Indeterminate forms, sequences and series, Taylor's formula and series. Precludes additional credit for [BIT 2007](https://calendar.carleton.ca/search/?P=BIT%202007), [MATH 1002](https://calendar.carleton.ca/search/?P=MATH%201002), [MATH 1005](https://calendar.carleton.ca/search/?P=MATH%201005).
Prerequisite(s): i) [MATH 1004](https://calendar.carleton.ca/search/?P=MATH%201004), or a grade of C- or higher in [MATH 1007](https://calendar.carleton.ca/search/?P=MATH%201007); or permission of the School.
Lectures three hours a week, tutorial one hour a week.

**MATH 2107 [0.5 credit]
Linear Algebra II**
Finite-dimensional vector spaces (over R and C), subspaces, linear independence and bases. Linear transformations and matrices. Inner product spaces (over R and C); Orthonormal bases. Eigenvalues and diagonalization. Bilinear and quadratic forms; principal axis theorem. Precludes additional credit for [MATH 1102](https://calendar.carleton.ca/search/?P=MATH%201102).
Prerequisite(s): i) [MATH 1104](https://calendar.carleton.ca/search/?P=MATH%201104), or a grade of C- or higher in [MATH 1107](https://calendar.carleton.ca/search/?P=MATH%201107) or MATH 1109; and ii) a grade of C- or higher in [MATH 1007](https://calendar.carleton.ca/search/?P=MATH%201007) or equivalent; or permission of the School. Note: in item i), [MATH 1119](https://calendar.carleton.ca/search/?P=MATH%201119) is NOT acceptable as a substitute for MATH 1109. Lectures three hours a week and one hour tutorial.

**MATH 2108/3101 [0.5 credit]
Abstract Algebra I**
Sets and relations, number theory, group theory, ring theory, cardinal numbers.

Precludes additional credit for [MATH 3101](https://calendar.carleton.ca/search/?P=MATH%203101) and [MATH 2100](https://calendar.carleton.ca/search/?P=MATH%202100).
Prerequisite(s): i) [MATH 1102](https://calendar.carleton.ca/search/?P=MATH%201102) or [MATH 2107](https://calendar.carleton.ca/search/?P=MATH%202107); and ii) [MATH 1800](https://calendar.carleton.ca/search/?P=MATH%201800) ([MATH 1800](https://calendar.carleton.ca/search/?P=MATH%201800) may be taken concurrently, with permission of the School); or [COMP 1805](https://calendar.carleton.ca/search/?P=COMP%201805) or [MATH 1805](https://calendar.carleton.ca/search/?P=MATH%201805); or permission of the School.
Lectures three hours a week and one hour tutorial.

**MATH 3705 [0.5 credit]
Mathematical Methods I**
Laplace transforms, series solutions of ordinary differential equations, the Frobenius method. Fourier series and Fourier transforms, solutions of partial differential equations of mathematical physics, boundary value problems, applications. This course may be taken for credit as a 3000-level Honours Mathematics course, by students in any Honours program in the School of Mathematics and Statistics. Precludes additional credit for [PHYS 3808](https://calendar.carleton.ca/search/?P=PHYS%203808).
Prerequisite(s): i) [MATH 1005](https://calendar.carleton.ca/search/?P=MATH%201005) or [MATH 2404](https://calendar.carleton.ca/search/?P=MATH%202404), and ii) [MATH 2004](https://calendar.carleton.ca/search/?P=MATH%202004) or [MATH 2008](https://calendar.carleton.ca/search/?P=MATH%202008) or MATH 2009; or permission of the School.
Lectures three hours a week and one hour tutorial.

**MATH 3800 [0.5 credit]
Mathematical Modeling and Computational Methods**
Design and analysis of mathematical models for problems in science. Computational methods, including function evaluation, interpolation, solution of linear equations, root finding, integration, solution of differential equations, Fourier series and Monte Carlo methods. Includes: Experiential Learning Activity. Also listed as CMPS 3800.
Precludes additional credit for [MATH 3806](https://calendar.carleton.ca/search/?P=MATH%203806)/COMP 3806.
Prerequisite(s): i) [MATH 1107](https://calendar.carleton.ca/search/?P=MATH%201107) or [MATH 1104](https://calendar.carleton.ca/search/?P=MATH%201104); ii) [MATH 1005](https://calendar.carleton.ca/search/?P=MATH%201005) or [MATH 2007](https://calendar.carleton.ca/search/?P=MATH%202007); and iii) knowledge of a computer language.
Lectures three hours a week, laboratory one hour a week.

**MATH 3802 [0.5 credit]
Combinatorial Optimization**
Network flow problems, network simplex method, max-flow min-cut problem, integral polyhedra, minimum-weight spanning tree problem, maximum matching problem, maximum stable set problem, introduction to approximation algorithms.

Prerequisite(s): MATH 3801 or permission of the School.
Lectures three hours a week, tutorial one hour a week.

**STAT 2509 [0.5 credit]**

**Introduction to Statistical Modeling II**

A data-driven approach to statistical modeling. Basics of experimental design, analysis of variance, simple linear regression and correlation, nonparametric procedures. A statistical software package will be used. Precludes additional credit for STAT 2607, ECON 2202.

Prerequisite(s): i) STAT 2507 and ii) Grade 12 Mathematics (Geometry and Discrete Mathematics), or MATH 0107; or equivalents; or permission of the School. Lectures three hours a week, laboratory one hour a week.

**STAT 2606 [0.5 credit]
Business Statistics I**
Introduction to statistical computing; probability concepts; descriptive statistics; estimation and testing of hypotheses. Emphasis on the development of an ability to interpret results of statistical analyses with applications from business. Restricted to students in the School of Business. Includes: Experiential Learning Activity
Precludes additional credit for [BIT 2000](https://calendar.carleton.ca/search/?P=BIT%202000), BIT 2100 (no longer offered), BIT 2300 (no longer offered), ECON 2201 (no longer offered), [ECON 2210](https://calendar.carleton.ca/search/?P=ECON%202210), [ENST 2006](https://calendar.carleton.ca/search/?P=ENST%202006), [GEOG 2006](https://calendar.carleton.ca/search/?P=GEOG%202006), [STAT 2507](https://calendar.carleton.ca/search/?P=STAT%202507), and [STAT 3502](https://calendar.carleton.ca/search/?P=STAT%203502).
Prerequisite(s): [MATH 1009](https://calendar.carleton.ca/search/?P=MATH%201009) with a grade of C- or better, or permission of the School.
Lectures three hours a week and laboratory one hour a week.

**STAT 3503 [0.5 credit]
Regression Analysis**Review of simple and multiple regression with matrices, Gauss-Markov theorem, polynomial regression, indicator variables, residual analysis, weighted least squares, variable selection techniques, nonlinear regression, correlation analysis and autocorrelation. Computer packages are used for statistical analyses. Includes: Experiential Learning Activity
Precludes additional credit for [STAT 3553](https://calendar.carleton.ca/search/?P=STAT%203553).
Prerequisite(s): i) [STAT 2509](https://calendar.carleton.ca/search/?P=STAT%202509) or [STAT 2607](https://calendar.carleton.ca/search/?P=STAT%202607) or ECON 2202 or [ECON 2220](https://calendar.carleton.ca/search/?P=ECON%202220) or equivalent; and ii) [MATH 1102](https://calendar.carleton.ca/search/?P=MATH%201102) or [MATH 1107](https://calendar.carleton.ca/search/?P=MATH%201107) or [MATH 1119](https://calendar.carleton.ca/search/?P=MATH%201119) or equivalent; or permission of the School.
Lectures three hours a week and one hour laboratory.

**STAT 3504 [0.5 credit]
Analysis of Variance and Experimental Design**Single and multifactor analysis of variance, orthogonal contrasts and multiple comparisons, analysis of covariance; nested, crossed and repeated measures designs; completely randomized, randomized block, Latin squares, factorial experiments, related topics. Computer packages are used for statistical analyses. Includes: Experiential Learning Activity
Precludes additional credit for [STAT 4504](https://calendar.carleton.ca/search/?P=STAT%204504).
Prerequisite(s): [STAT 3503](https://calendar.carleton.ca/search/?P=STAT%203503) or permission of the School.
Lectures three hours a week and one hour laboratory.