

Contract Instructor Opportunities
Fall/Winter 2022-2023
Carleton University, School of Mathematics and Statistics

As stated in Article 16 of the CUPE 4600 Unit 2 Collective Agreement, applications are invited from members of the CUPE 4600 Unit 2 bargaining unit and other interested persons to teach the following Mathematics and Statistics courses during Fall/Winter 2022-2023 Terms.

Classes are scheduled for in-person, however the University may require that all or part of these courses be delivered remotely, including online.

FALL 2022 courses		
BIT	1100	
BIT	1101	
BIT	2010	
MATH	0009	
MATH	1004	2 Sections available for application
MATH	1005	
MATH	1007	2 Sections available for application
MATH	1009	
MATH	2007	
MATH	3800	
MATH	3801	
STAT	2507	
STAT	4502	
WINTER 2023 courses		
MATH	1004	
MATH	1007	
MATH	1104	1 Section available for application
MATH	1107	1 Section available for application
MATH	2004	
STAT	2507	
STAT	2509	
STAT	2601	
STAT	2602	
STAT	3507	

Article 17: the following course sections have been assigned to doctoral students, postdoctoral fellows, or visiting scholars, and therefore are not open for applications. The department will contact the most senior incumbent to review their rights under Article 17.6

STAT	3503	1 of 1 section to Article 17
MATH	1004	2 sections to Article 17
MATH	1007	2 sections to Article 17
MATH	1104	4 sections to Article 17
MATH	1107	1 section to Article 17

Required Qualifications:

Candidates should hold at least an MSc in Mathematics, Statistics, or related field, and demonstrate teaching competence in a relevant area, preferably at the university level.

Course descriptions for the current posting are appended below.

Application Procedures and Deadlines:

Deadline to apply is May 23, 2022. Applications indicating a list of courses for which you wish to be considered, [must be submitted via the online form](#).

Questions can be directed to margaret.tannahillwade@carleton.ca, School Administrator.

A note to all applicants: As per Articles 16.3 and 16.4 in the CUPE 4600 Unit 2 Collective Agreement, the posted vacancies listed above are first offered to applicants meeting the incumbency criteria. The current Collective Agreement and seniority lists can be found on the Carleton University Human Resources website <https://carleton.ca/hr/labour-relations/academic-staff-agreements/> and on the CUPE 4600 Unit 2 website <https://www.cupe4600.ca/unit-2>.

All the above listed positions are subject to budgetary approval.

FALL/WINTER 2022-2023 CONTRACT INSTRUCTOR ADVERTISED COURSES

Fall Term

BIT 1100 [0.5 credit]

Mathematics I for IMD

Tailored for students in the Interactive Multimedia Design program, this course covers basic concepts in functions (polynomials, exponential, logarithmic) and introduces concepts of limits, derivatives and rules of differentiation, applications of differentiation (max-min problems, curve sketching) and integration.

BIT 1101 [0.5 credit]

Mathematics II for IMD

Tailored for students in the Interactive MultiMedia Design program, this course covers systems of linear equations, vector space of n-tuples, subspaces and bases, matrix transformations, kernel, range, matrix algebra and determinants, inner products and orthogonality, eigenvalues, diagonalization and applications.

BIT 2010 [0.5 credit]

Differential Equations & Multivariate Calculus

Curves and surfaces. Polar, cylindrical and spherical coordinates. Partial derivatives, gradients, extrema and Lagrange multipliers. Exact differentials. Multiple integrals over rectangular and general regions. Integrals over surfaces. Line integrals. Vector differential operators. Green's Theorem, Stokes' theorem, Divergence Theorem. Applications.

MATH 0009 [0.5 credit]

Calculus and Vectors

Limits and continuity. Differentiation rules. Trigonometric, logarithmic, and exponential functions, and their derivatives. Curve sketching. Optimization problems. Introduction to vectors. Dot and cross products. Projections. Equations of lines and planes. Intersection points and distances between points, lines, and planes.

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.

MATH 1005 [0.5 credit]

Differential Equations and Infinite Series for Engineering or Physics

First-order differential equations. Second-order linear equations with constant coefficients, undetermined coefficients, variation of parameters. Sequences and series, convergence tests, estimation of sums. Power series, Taylor series, remainders. Fourier series.

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.

MATH 1009 [0.5 credit]

Mathematics for Business

An introductory course of mathematics for business. Thorough review of basic arithmetic and algebra. Elementary functions, their graphs, properties and applications in business models. Limits. Derivatives of elementary functions. Systems of linear equations/inequalities. Geometric series.

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.

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.

MATH 3801 [0.5 credit]**Linear Programming**

Systems of linear inequalities, formulation of linear programming problems, geometric method, the simplex method, duality theory, complementary slackness, sensitivity analysis, branch-and-bound method and cutting plane method for integer linear programming, applications and extensions.

STAT 2507 [0.5 credit]**Introduction to Statistical Modeling I**

A data-driven introduction to statistics. Basic descriptive statistics, introduction to probability theory, random variables, discrete and continuous distributions, contingency tables, sampling distributions, distribution of sample mean, Central Limit Theorem, interval estimation and hypothesis testing. A statistical software package will be used.

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.

STAT 4502 [0.5 credit]**Survey Sampling (Honours)**

Basic concepts in sampling from finite populations; simple random sampling; stratified sampling; choice of sampling unit; cluster and systematic sampling; introduction to multistage sampling; ratio estimation; sampling with unequal probabilities and with replacement; replicated sampling; related topics.

Winter Term

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.

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.

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 \mathbb{R}^n ; subspaces, bases. Eigenvalues, diagonalization. Linear transformations, kernel, range. Complex numbers (including De Moivre's theorem). Inner product spaces and orthogonality. Applications.

MATH 1107 [0.5 credit]**Linear Algebra I**

Systems of linear equations; vector space of n -tuples, subspaces, bases; matrix transformations, kernel, range; matrix algebra and determinants. Dot product. Complex numbers (including de Moivre's Theorem, and n -th roots). Eigenvalues, diagonalization and applications.

MATH 2004 [0.5 credit]**Multivariable Calculus for Engineering or Physics**

Curves and surfaces. Polar, cylindrical and spherical coordinates. Partial derivatives, gradients, extrema and Lagrange multipliers. Exact differentials. Multiple integrals over rectangular and general regions. Integrals over surfaces. Line integrals. Vector differential operators. Green's Theorem, Stokes' theorem, Divergence Theorem. Applications.

STAT 2507 [0.5 credit]**Introduction to Statistical Modeling I**

A data-driven introduction to statistics. Basic descriptive statistics, introduction to probability theory, random variables, discrete and continuous distributions, contingency tables, sampling distributions, distribution of sample mean, Central Limit Theorem, interval estimation and hypothesis testing. A statistical software package will be used.

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.

STAT 2601 [0.5 credit]**Business Statistics**

Introduction to statistical computing, descriptive statistics, probability concepts, interval estimation and hypothesis testing, categorical data analysis. Introduction to simple regression, multiple regression, and time series. Emphasis on the development of an ability to interpret results of statistical analyses with applications from business.

STAT 2602 [0.5 credit]**Statistical Models for Business Analytics and Finance**

Analysis of variance, multiple regression (including polynomial regression), logistic and Poisson regression, probit models, time series (including decomposition into components, exponential smoothing, model diagnostics and ARIMA models), Monte Carlo simulation.

STAT 3507 [0.5 credit]**Sampling Methodology**

The sample survey as a vehicle for information collection in government, business, scientific and social agencies. Topics include: planning a survey, questionnaire design, simple random, stratified, systematic and cluster sampling designs, estimation methods, problem of non-response, related topics.