

MATHEMATICS (MATH)

MATH*6010 Analysis Unspecified [0.50]

Half the course covers metric spaces, normed linear spaces, and inner product spaces, including Banach's and Schauder's fixed point theorems, L_p spaces, Hilbert spaces and the projection theorem. The remaining content may include topics like operator theory, inverse problems, measure theory and spectral analysis.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6011 Dynamical Systems I Unspecified [0.50]

Basic theorems on existence, uniqueness and differentiability; phase space, flows, dynamical systems; review of linear systems, Floquet theory; Hopf bifurcation; perturbation theory and structural stability; differential equations on manifolds. Applications drawn from the biological, physical, and social sciences.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6012 Dynamical Systems II Unspecified [0.50]

The quantitative theory of dynamical systems defined by differential equations and discrete maps, including: generic properties; bifurcation theory; the center manifold theorem; nonlinear oscillations, phase locking and period doubling; the Birkhoff-Smale homoclinic theorem; strange attractors and deterministic chaos.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6020 Scientific Computing Unspecified [0.50]

This course covers the fundamentals of algorithms and computer programming. This may include computer arithmetic, complexity, error analysis, linear and nonlinear equations, least squares, interpolation, numerical differentiation and integration, optimization, random number generators, Monte Carlo simulation; case studies will be undertaken using modern software.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6021 Optimization I Unspecified [0.50]

A study of the basic concepts in: linear programming, convex programming, non-convex programming, geometric programming and related numerical methods.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6022 Optimization II Unspecified [0.50]

A study of the basic concepts in: calculus of variations, optimal control theory, dynamic programming and related numerical methods.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6031 Functional Analysis Unspecified [0.50]

Hilbert, Banach and metric spaces are covered including applications. The Baire Category theorem is covered along with its consequences such as the open mapping theorem, the principle of uniform boundedness and the closed graph theorem. The theory of linear functionals is discussed including the Hahn-Banach theorem, dual spaces, and if time permits, weak topologies or generalized functions. Basic operator theory is covered including topics such as adjoints, compact operators, the Fréchet derivative and spectral theory. A brief introduction to the concepts of measure and integration required for some of the aforementioned topics is also included. Offered in conjunction with MATH*4220. Extra work is required of graduate students.

Restriction(s): Credit may be obtained for only one of MATH*4220 or MATH*6031

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6041 Partial Differential Equations I Unspecified [0.50]

Classification of partial differential equations. The Hyperbolic type, the Cauchy problem, range of influence, well- and ill-posed problems, successive approximation, the Riemann function. The elliptic type: fundamental solutions, Dirichlet and Neumann problems. The parabolic type: boundary conditions, Green's functions and separation of variables. Introduction to certain non-linear equations and transformations methods. Offered in conjunction with MATH*4270. Extra work is required for graduate students.

Restriction(s): Credit may be obtained for only one of MATH*4270 or MATH*6041

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6042 Partial Differential Equations II Unspecified [0.50]

A continuation of some of the topics of Partial Differential Equations I. Also, systems of partial differential equations, equations of mixed type and non-linear equations.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6051 Mathematical Modelling Unspecified [0.50]

The process of phenomena and systems model development, techniques of model analysis, model verification, and interpretation of results are presented. The examples of continuous or discrete, deterministic or probabilistic models may include differential equations, difference equations, cellular automata, agent based models, network models, stochastic processes.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6071 Biomathematics Unspecified [0.50]

The application of mathematics to model and analyze biological systems. Specific models to illustrate the different mathematical approaches employed when considering different levels of biological function.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6091 Topics in Analysis Unspecified [0.50]

Selected topics from topology, real analysis, complex analysis, and functional analysis.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6181 Topics in Applied Mathematics I Unspecified [0.50]

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in applied mathematics under the guidance of graduate faculty. Course topics will normally be advertised by faculty in the semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6182 Topics in Applied Mathematics II Unspecified [0.50]

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in applied mathematics under the guidance of graduate faculty. Course topics will normally be advertised by faculty in the semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6400 Numerical Analysis I Unspecified [0.50]

Topics selected from numerical problems in: matrix operations, interpolation, approximation theory, quadrature, ordinary differential equations, partial differential equations, integral equations, nonlinear algebraic and transcendental equations.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6410 Numerical Analysis II Unspecified [0.50]

One or more topics selected from those discussed in Numerical Analysis I, but in greater depth.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph

MATH*6998 MSc Project in Mathematics Unspecified [1.00]

This course is intended for students in the course-based MSc program in Mathematics. The MSc project will be written under the supervision of a faculty member and will normally be completed within one or two semesters. Once completed, students will submit a final copy of their project to the Department and give an oral presentation of their work.

Restriction(s): Restricted to MSC.MAST:L-MATH students.

Department(s): Department of Mathematics and Statistics

Location(s): Guelph