Mathematics is a fundamental basis for a large number of activities in the modern world and is a gateway to numerous professions. Pursuing a Mathematics program will give you knowledge in various branches of pure and applied mathematics, such as analysis, linear and modern algebra, topology and geometry, probability and statistics, and financial mathematics.
OUR DEPARTMENT

In the spring of 1984, the Senate of York University approved the establishment of a bilingual Department of Mathematics at Glendon. The Fall/Winter 2013-2014 academic session marks the 30th year of operation of our department.

Glendon is a liberal arts faculty and therefore places emphasis on general education, the humanities and the social sciences. The mathematics programs of our department complement the range of studies offered by Glendon because:

- Mathematics is an essential component of a general education and it will become even more so in the future;
- Mathematics is an important methodological tool used in all of the social sciences (economics, political science, psychology, sociology, etc.) as well as in the humanities;
- Mathematics is one of the liberal arts in the full sense of the term which is studied for its own sake and its merits outshine its almost unlimited applications in the real world.

This document is the mini calendar of the Mathematics Department. It intends to describe in full details the courses offered by our department in 2013-2014.

OUR PROGRAMS

We offer 6 BA Programs and 4 International BA (iBA) Programs in Mathematics.

- Specialized Honours BA
- Specialized Honours iBA
- Honours BA
- Honours iBA
- Honours Double Major BA
- Honours Double Major iBA
- Honours Major/Minor BA
- Honours Major/Minor iBA
- Honours Minor BA
- Bachelor of Arts

For detailed program requirements, please refer to the York University Undergraduate Calendar applicable to your year of entry into the program.
OUR PROFESSORS

JEAN-CLAUDE BOUHÉNIC, PROFESSOR EMERITUS

Research Areas:

Jean-Claude’s areas of specialization and research are probability theory, statistics and econometrics.

Publications:

Author of a mathematics textbook entitled “Calcul différentiel et intégral”, GREF, Toronto (1998). This is the accompanying text for the TV course entitled “Calculo ergo sum” broadcasted on TFO.

SAMIA CHALLAL, ASSISTANT PROFESSOR

Research Areas:

Partial Differential Equation, Problems arising from Mechanic, Free boundary problems

Publications:

http://dx.doi.org/10.1080/00036811.2012.683787
HY STUDY MATHEMATICS AT GLENDON?

- Small classes will ensure you receive personalized attention from dedicated, approachable and qualified professors through the various stages of your learning.
- Study with high-profile professors working in a variety of mainstream branches of modern mathematics. Jean-Claude Bouhénic specializes in probability and statistics. Alexander Nenashev’s research focuses on modern algebra (more specifically, in algebraic K-theory, Witt theory, and algebraic geometry). Mario Roy pursues research in analysis (more precisely, in the field of dynamical systems and ergodic theory, with an emphasis on thermodynamics). David Spring’s interests are in the areas of differential geometry and topology and the history of these disciplines.
- Studying mathematics in our liberal arts context gives you the flexibility to explore other academic areas of interest. Combine your mathematics studies with economics, business economics, linguistics, psychology, or another discipline of your choice for a well-rounded education and open yourself the doors to a wide range of professions.
- Mathematics can be a useful tool for analysis in all of the liberal arts.
- Mathematics is available as a bilingual or trilingual international Bachelor of Arts.

WHAT CAN YOU DO WITH A DEGREE IN MATHEMATICS?

A mathematics degree can lead to work in teaching, banking, finance, insurance, actuarial science, statistics, business analysis and research, among others.
MATHEMATICS DEPARTMENT GUIDELINES

FOR ALL GLENDON MATHEMATICS MAJORS

Students planning a Mathematics degree should take the following courses in their first two years of studies:

- First-Year: GL/MATH 1650 3.00 Modes of Mathematical Reasoning
  GL/MATH 1930 3.00 & 1940 3.00 Calculus I & II
- First- or Second-Year: GL/MATH 2650 & 2660 3.00 Linear Algebra I & II
- Second-Year: GL/MATH 2670 6.00 Second-Year Calculus

In their third and fourth years, students should choose their courses in consultation with the Chair of the Department of Mathematics. This is all the more important because some of the higher-level mathematics courses are offered in alternate years.

IMPORTANT NOTICE

**COMPULSORY COURSE**

to get a Mathematics degree from Glendon

**GL/MATH 2670 6.00 SECOND-YEAR CALCULUS**

Students **must take this course** to fulfill the requirements of their Glendon Mathematics’ degree.

**This course cannot be replaced by similar courses** offered at the Keele campus. The two courses SC/MATH 2310 3.00 (Calculus of Several Variables with Applications) and SC/MATH 3010 3.00 (Vector Integral Calculus) offered by the Mathematics Department of the Faculty of Science will not count as equivalent credits to GL/MATH 2670 6.00 Second-Year Calculus.

Due to budgetary constraints, the Department of Mathematics at Glendon cannot always offer all the courses required for a Specialized Honours BA Program.

For that reason, students pursuing that program at Glendon may have to take some 3000 or 4000 level mathematics courses at the Keele campus in order to complete their degree. Those courses should be selected in consultation with the Chair of the Department of Mathematics at Glendon.

ACADEMIC ADVISING & RESOURCES

Glendon’s Office of Academic Services provides a range of registration and support services to students. This office is responsible for maintaining the integrity of student academic records and offers information on University and College rules and regulations, courses and registration, grade reporting and degree audit, graduation and transcripts, and academic advising. You will be able to obtain information on all academic matters from initial registration through to graduation.

ACADEMIC SERVICES

Room C102 York Hall
2275 Bayview Avenue
Toronto, Ontario
M4N 3M6
Canada
Telephone: 416.487.6715
Fax: 416.487.6813
Email: acadservices@glendon.yorku.ca
Website: www.glendon.yorku.ca/acadservices

QUICK LINKS:

Undergraduate Calendar: [http://calendars.registrar.yorku.ca](http://calendars.registrar.yorku.ca)

Lecture Schedule: [https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm](https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm)


LANGUAGE TRAINING CENTRE FOR STUDIES IN FRENCH

The Language Training Centre for Studies in French welcomes students who want to improve their knowledge of French in order to meet Glendon’s base bilingual requirement, which is the minimum requirement to graduate from Glendon. The FSL courses are open to all students majoring and minoring in fields other than French Studies or Translation.

The Language Training Centre for Studies in French
fsl@glendon.yorku.ca
416-736-2100 x88222
CORE COURSES / COURS DE BASE:

- GL/MATH 1650 3.00
- GL/MATH 1930 3.00 and GL/MATH 1940 3.00
- GL/MATH 1660 3.00 and GL/MATH 2660 3.00
- GL/MATH 2670 6.00

Note: Course substitutes must be approved by the Department's Chair.

COURSE/COURS TITLE/TITRE TERM/TRIMESTRE

MATH 1610 (EN) 3.00 Introduction to Statistical Methods I Fall
MATH 1620 (EN) 3.00 Introduction to Statistical Methods II Winter
MATH 1650 (EN) 3.00 Modes of Mathematical Reasoning Fall
MATH 1660 (EN) 3.00 Linear Algebra I Fall
MATH 1670 (EN) 6.00 Fundamentals of Mathematics Fall
MATH 1930 (EN) 3.00 Calculus I Fall & Winter
MATH 1930 (FR) 3.00 Calcul différentiel et intégral I Automne
MATH 1940 (EN) 3.00 Calculus II Winter
MATH 1940 (FR) 3.00 Calcul différentiel et intégral II Hiver
MATH 2660 (EN) 3.00 Linear Algebra II Winter
MATH 2670 (FR) 6.00 Calcul des fonctions de plusieurs variables Annuel
MATH 3400 (EN) 3.00 Differential Equations Fall
MATH 3645 (EN) 3.00 Optimization Winter
MATH 4230 (FR) 6.00 Analyse complexe Annuel
GL/MATH/MODR 1650 3.00 (EN) MODES OF MATHEMATICAL REASONING (FALL)

Instructor: A. Nenashev TUE 9:00 – 10:30 & THU 9:00 – 10:30

This proof-based course introduces the student to various proof techniques. Its main objective is to familiarize the student with mathematical proofs, as opposed to mathematical calculations.

The course develops practical logic: true and false statements; correct and incorrect conclusions; quantifiers. The language of sets is also studied: set operations; Cartesian products; finite and infinite sets; composite functions (mappings); invertible functions; direct and inverse images. Mathematical induction and combinatorics will also be discussed.

Designed as a first-year course, this course has not been offered over the last few years. For this reason, we recommend it to the 2nd-, 3rd- and 4th-year students as well. It constitutes an excellent preparation for GL/MATH 2660 and for the 3000 and 4000 level courses.

**Prerequisite:** Any grade 12 Mathematics course.

**Course credit exclusion:** SC/MATH 1190 3.00.

This course is open to all students who meet the prerequisite.

GL/MATH 1660 3.00 LINEAR ALGEBRA I (FALL)

Enseignant : A Nenashev TUE 10:30 – 12:00 & THU 10:30 – 12:00

This basic mathematics course is very useful for someone who wishes to do applied research in the social sciences. Among the topics considered are vectors, bases, matrices, systems of linear equations, rank and determinants. Some applications of linear algebra to various other disciplines, such as economics, are also included.

**Course credit exclusions:** SC/MATH 1021 3.00, SC/MATH 2221 3.00 and GL/MATH/MODR 2650 3.00.

GL/MATH/MODR 1670 6.00 (EN) FUNDAMENTALS OF MATHEMATICS (FALL)

Instructor: TBA MON, TUE & THU 18:30 – 20:30

Intended for students whose high school mathematical background is either weak or incomplete, this precalculus course is designed to train and improve the logical and technical skills in the use of basic mathematics and is a good preparation for calculus. Topics are chosen from: basic algebra; linear, quadratic, polynomial, exponential, logarithmic and trigonometric functions; systems of equations; inequalities; probability; series; and derivatives.

**Course credit exclusion:** SC/MATH 1510 6.00.

This course is open to all.
AVIS AUX ÉTUDIANTS :

Les étudiants qui comptent prendre le cours GL/MATH/MODR 1930 3.00 Calcul différentiel et intégral I doivent avoir terminé un cours de douzième année en mathématiques. Les étudiants qui n’ont pas ce prérequis, qui ont de la difficulté avec les mathématiques ou qui retournent aux études après plusieurs années d’absence devraient tout d’abord prendre le cours préparatoire GL/MATH/MODR 1670 6.00 Fundamentals of Mathematics pour améliorer leurs compétences en algèbre, en trigonométrie et dans des sujets connexes et afin de profiter plus pleinement des cours de mathématiques de niveau universitaire comme les cours de calcul.

GL/MATH/MODR 1930 3.00 (FR) CALCUL DIFFÉRENTIEL ET INTÉGRAL I (AUTOMNE)

GL/MATH/MODR 1940 3.00 (FR) CALCUL DIFFÉRENTIEL ET INTÉGRAL II (HIVER)

Enseignant : A déterminer MAR et JEU 13:00 – 15:00

Les cours GL/MATH/MODR 1930 et 1940 sont offerts en anglais et en français et sont conçus :

i) pour fournir aux étudiants une base solide en calcul différentiel et intégral pouvant servir dans d’autres disciplines comme les sciences économiques et les sciences sociales ;

ii) pour préparer adéquatement les étudiants qui souhaitent poursuivre des études plus avancées en mathématiques.

Les notions abordées en Calcul I sont les fonctions d’une variable, leurs limites, leur continuité, leur dérivation et ses applications, de même que le théorème de la valeur moyenne et ses applications à la représentation graphique et à l’optimisation des fonctions.

Le cours Calcul II est la suite du cours Calcul I. Il traite des primitives des fonctions d’une variable, de leur intégrale de Riemann et des techniques d’intégration. Il discute en outre des fonctions inversibles, dont les fonctions logarithmiques et exponentielles, les fonctions trigonométriques et leurs inverses, et les fonctions hyperboliques. Enfin, ce cours s’intéresse aux formes indéterminées et à la levée d’indéterminations au moyen de la règle de l’Hôpital. Une introduction aux fonctions de plusieurs variables et leurs dérivées partielles sera donnée si le temps le permet.

REMARQUE :

Les cours Calcul différentiel et intégral I et II font partie des exigences des baccalauréats spécialisés en Économie et en Economie et Commerce de Glendon. Dans ce cadre, ces cours doivent être complétés avant la fin de la deuxième année d’études. De plus, ces cours satisfont à l’une des conditions d’admission au programme de Baccalauréat en Administration.
The courses GL/MATH/MODR 1930 and 1940 are offered in English and French and are designed:

i) to provide students with a sound foundation in calculus for application to other disciplines such as economics and the other social sciences;

ii) to adequately prepare students wishing to undertake more advanced studies in mathematics.

The topics covered in Calculus I are functions of one variable, their limits, their continuity, their differentiation and its applications, the mean value theorem and its applications to curve sketching and optimization of functions.

Calculus II is the sequel of Calculus I. It deals with antiderivatives of functions of one variable, of their Riemann integral, and of various integration techniques. It also discusses invertible functions, among which logarithmic and exponential functions, trigonometric and inverse trigonometric functions, and hyperbolic functions.

Finally, it examines indeterminate forms and the removal of indetermination using L'Hospital's Rule. An introduction to functions of several variables and their partial derivatives will be given, time permitting.
2000 LEVEL COURSES / COURS DE NIVEAU 2000

GL/MATH/MODR 2660 3.00 (EN) LINEAR ALGEBRA II (WINTER)
Instructor: S. Challal    TUE 11:00 – 12:00 & THU 10:00 – 12:00
This course is a continuation of Linear Algebra I: More about vector spaces, linear transformations, eigenvalues and eigenvectors. Diagonalization of matrices, quadratic forms, and symmetric and orthogonal matrices are also studied.

Prerequisite: GL/MATH/MODR 2650 3.00.
Course credit exclusions: SC/MATH 2022 3.00, SC/MATH 2222 3.00.
This course is open to all students who meet the prerequisite.

GL/MATH/MODR 2670 6.00 (FR) CALCUL DES FONCTIONS DE PLUSIEURS VARIABLES (ANNUEL)
Enseignant: A déterminer    LUN et MER 13:00 – 15:00
Ce cours porte principalement sur l’étude des fonctions de plusieurs variables, de leurs dérivées partielles, de leurs intégrales (doubles et triples, en particulier), de leur optimisation sous contraintes, et de leur développement en série de Taylor. Le calcul vectoriel dans $\mathbb{R}^n$ ainsi que les suites et les suites et séries numériques sont aussi discutés.

Condition préalable : GL/MATH/MODR 1940 3.00.
Cours incompatible : SC/MATH 2310 3.00.

3000 LEVEL COURSES / COURS DE NIVEAU 3000

GL/MATH 3400 3.00 (EN) DIFFERENTIAL EQUATIONS (FALL)
Instructor: S. Challal    TUE & THU 13:00 – 14:30
An introduction to differential equations, including a discussion of the formulation of mathematical models for real phenomena; exact solution techniques, numerical methods, and applications; solutions in series; other topics if time permits.

Prerequisite: GL/MATH 2670 6.00 or permission of the department.
Course credit exclusion: GL/MATH 3400 6.00.
This course is open to all students who meet the prerequisite.

GL/MATH 3645 3.00 (EN) OPTIMIZATION WITH APPLICATIONS TO ECONOMICS (WINTER)
Instructor: S. Challal    TUE 12:00 – 14:00 & THU 12:00 – 13:00
This is an introductory course in optimization. Topics include local and global extrema, convex functions, Lagrange multipliers, the Kuhn-Tucker conditions, and optimal control. Applications to a variety of problems in Economics.

Prerequisites: GL/MATH 1940 3.00 and GL/MATH 2660 3.00.
Open to students in second-, third- or fourth-year who meet the prerequisites.
GL/MATH 4230 6.00 (FR) ANALYSE COMPLEXE (ANNUEL)

Enseignant : A déterminer        MAR et JEU 16:00 – 17:30

La topologie du plan complexe. Introduction aux fonctions holomorphes ; applications conformes et applications linéaires fractionnelles. L'intégration complexe, la formule intégrale de Cauchy. La théorie des résidus. Les propriétés locales des fonctions holomorphes ; les fonctions harmoniques. Prolongement analytique ; le théorème de Riemann.

Conditions préalables : GL/MATH 2670 6.00 ou la permission du département.

Cours incompatible : SC/MATH 3410 3.00

Cours ouvert aux étudiants de troisième et de quatrième années.