

# APPLIED MATHEMATICS HONOURS (B.SC.) (63 CREDITS)

**Offered by:** Mathematics and Statistics (Faculty of Science)

**Degree:** Bachelor of Arts

**Program credit weight:** 63

## Program Description

The B.Sc.; Honours in Applied Mathematics provides an in-depth training, at the honours level, in “discrete” or “continuous” applied mathematics. It gives the foundations and necessary tools to explore some areas such as numerical analysis, continuous and discrete optimization, graph theory, discrete probability. The program also provides the background required to pursue interdisciplinary research at the interface between mathematics and other fields such as biology, physiology, and the biomedical sciences. This program may be completed with a minimum of 60 credits or a maximum of 63 credits.

Students may complete this program with a minimum of 60 credits or a maximum of 63 credits depending if they are exempt from MATH 222 Calculus 3..

### Degree Requirements — B.A. students

To be eligible for a B.A. degree, a student must fulfil all Faculty and program requirements as indicated in Degree Requirements for the Faculty of Arts.

We recommend that students consult an Arts OASIS advisor for degree planning.

**Note:** For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the “Terms offered” field will appear blank for most courses while the class schedule is being finalized.

## Program Prerequisites

The minimum requirement for entry into the Honours program is that the student has completed with high standing the following courses below or their equivalents:

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Course	Title	Credits
MATH 133	Linear Algebra and Geometry.	3
MATH 150	Calculus A.	4
MATH 151	Calculus B.	4

In particular, MATH 150 Calculus A./MATH 151 Calculus B. and MATH 140 Calculus 1./MATH 222 Calculus 3. are considered equivalent.

Students who have not completed an equivalent of MATH 222 Calculus 3. on entering the program must consult an academic adviser and take MATH 222 Calculus 3. as a required course in the first semester, increasing the total number of program credits from 60 to 63. Students

who have successfully completed MATH 150 Calculus A./MATH 151 Calculus B. are not required to take MATH 222 Calculus 3..

Note: COMP 202 Foundations of Programming.—or an equivalent introduction to computer programming course—is a program prerequisite. U0 students may take COMP 202 Foundations of Programming. as a Freshman Science course; new U1 students should take it as an elective in their first semester.

Students who transfer to Honours in Applied Mathematics from other programs will have credits for previous courses assigned, as appropriate, by the Department.

To be awarded the Honours degree, the student must have, at time of graduation, a CGPA of at least 3.00 in the required and complementary Mathematics courses of the program, as well as an overall CGPA of at least 3.00.

## Required Courses (36-39 credits)

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Course	Title	Credits
COMP 250	Introduction to Computer Science. <sup>1</sup>	3
COMP 252	Honours Algorithms and Data Structures. <sup>2</sup>	3
MATH 222	Calculus 3.	3
MATH 247	Honours Applied Linear Algebra. <sup>3</sup>	3
MATH 251	Honours Algebra 2. <sup>3</sup>	3
MATH 255	Honours Analysis 2.	3
MATH 325	Honours Ordinary Differential Equations.	3
MATH 350	Honours Discrete Mathematics .	3
MATH 356	Honours Probability.	3
MATH 357	Honours Statistics.	3
MATH 358	Honours Advanced Calculus.	3
MATH 376	Honours Nonlinear Dynamics.	3
MATH 470	Honours Research Project.	3
MATH 475	Honours Partial Differential Equations.	3

- <sup>1</sup> Students with limited programming experience should take COMP 202 Foundations of Programming. or COMP 204 Computer Programming for Life Sciences. or COMP 208 Computer Programming for Physical Sciences and Engineering . or equivalent
- <sup>2</sup> before COMP 250 Introduction to Computer Science..
- <sup>3</sup> Students who have successfully completed MATH 150 Calculus A./MATH 151 Calculus B. or an equivalent of MATH 222 Calculus 3. on entering the program are not required to take MATH 222 Calculus 3.. Students select either MATH 251 Honours Algebra 2. or MATH 247 Honours Applied Linear Algebra., but not both.

## Complementary Courses (24 credits)

3 credits selected from:

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Course	Title	Credits
MATH 242	Analysis 1.	3
MATH 254	Honours Analysis 1. <sup>1</sup>	3

<sup>1</sup> It is strongly recommended that students take both MATH 245 Honours Algebra 1. and MATH 254 Honours Analysis 1.. Advising Notes: Students interested in continuous applied mathematics are urged to choose these as part of their Complementary Courses: MATH 454 Honours Analysis 3., MATH 455 Honours Analysis 4. and MATH 478 Computational Methods in Applied Mathematics ., and are advised to choose additional courses from MATH 387 Honours Numerical Analysis., MATH 397 Honours Matrix Numerical Analysis., MATH 555 Fluid Dynamics., MATH 574 Dynamical Systems., MATH 578 Numerical Analysis 1., MATH 579 Numerical Differential Equations., MATH 580 Advanced Partial Differential Equations 1 ., MATH 581 Advanced Partial Differential Equations 2 .. Students interested in discrete applied mathematics are advised to choose from these as part of their Complementary Courses: COMP 362 Honours Algorithm Design., COMP 490 , MATH 456 Honours Algebra 3., MATH 457 Honours Algebra 4., MATH 517 Honours Linear Optimization., MATH 547 Stochastic Processes., MATH 550 Combinatorics., MATH 552 Combinatorial Optimization..

3 credits selected from:

Course	Title	Credits
MATH 235	Algebra 1.	3
MATH 245	Honours Algebra 1. <sup>1</sup>	3

<sup>1</sup> It is strongly recommended that students take both MATH 245 Honours Algebra 1. and MATH 254 Honours Analysis 1.. Advising Notes: Students interested in continuous applied mathematics are urged to choose these as part of their Complementary Courses: MATH 454 Honours Analysis 3., MATH 455 Honours Analysis 4. and MATH 478 Computational Methods in Applied Mathematics ., and are advised to choose additional courses from MATH 387 Honours Numerical Analysis., MATH 397 Honours Matrix Numerical Analysis., MATH 555 Fluid Dynamics., MATH 574 Dynamical Systems., MATH 578 Numerical Analysis 1., MATH 579 Numerical Differential Equations., MATH 580 Advanced Partial Differential Equations 1 ., MATH 581 Advanced Partial Differential Equations 2 .. Students interested in discrete applied mathematics are advised to choose from these as part of their Complementary Courses: COMP 362 Honours Algorithm Design., COMP 490 , MATH 456 Honours Algebra 3., MATH 457 Honours Algebra 4., MATH 517 Honours Linear Optimization., MATH 547 Stochastic Processes., MATH 550 Combinatorics., MATH 552 Combinatorial Optimization..

3 credits selected from:

Course	Title	Credits
MATH 249	Honours Complex Variables.	3
MATH 466	Honours Complex Analysis.	3

3 credits selected from:

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Course	Title	Credits
MATH 387	Honours Numerical Analysis.	3
MATH 397	Honours Matrix Numerical Analysis.	3

0-6 credits from the following courses for which no Honours equivalent exists.

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Course	Title	Credits
MATH 204	Principles of Statistics 2.	3
MATH 208	Introduction to Statistical Computing.	3
MATH 308	Fundamentals of Statistical Learning.	3
MATH 329	Theory of Interest.	3
MATH 338	History and Philosophy of Mathematics.	3
MATH 430	Mathematical Finance.	3
MATH 451	Introduction to General Topology.	3
MATH 462	Machine Learning .	3
MATH 478	Computational Methods in Applied Mathematics .	3

0-12 credits selected from:

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Course	Title	Credits
COMP 362	Honours Algorithm Design.	3
MATH 352	Problem Seminar.	1
MATH 365	Honours Groups, Tilings and Algorithms.	3
MATH 377	Honours Number Theory.	3
MATH 398	Honours Euclidean Geometry .	3
MATH 454	Honours Analysis 3. <sup>1</sup>	3
MATH 455	Honours Analysis 4.	3
MATH 456	Honours Algebra 3.	3
MATH 457	Honours Algebra 4.	3
MATH 458	Honours Differential Geometry.	3
MATH 462	Machine Learning .	3
MATH 480	Honours Independent Study.	3
MATH 488	Honours Set Theory.	3

<sup>1</sup> Not open to students who have taken MATH 354 .

All MATH 500-level courses.

Other courses with the permission of the Department.