

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

Offered by: Mathematics and Statistics (Faculty of Science)

Degree: Bachelor of Science

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.Sc.

This program is offered as part of a Bachelor of Science (B.Sc.) degree.

To graduate, students must satisfy both their program requirements and their degree requirements.

- The program requirements (i.e., the specific courses that make up this program) are listed under the Course Tab (above).
- The degree requirements—including the mandatory Foundation program, appropriate degree structure, and any additional components—are outlined on the Degree Requirements page.

Students are responsible for ensuring that this program fits within the overall structure of their degree and that all degree requirements are met. Consult the Degree Planning Guide on the SOUSA website for additional guidance.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 12, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Course and section availability for the 2025–2026 academic year is now live on Visual Schedule Builder.

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:

Expand allContract all

| 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)

Expand allContract all

| Course | Title | Credits |
|----------|--|---------|
| COMP 250 | Introduction to Computer Science. ¹ | 3 |
| COMP 252 | Honours Algorithms and Data Structures. ² | 3 |
| MATH 222 | Calculus 3. | 3 |
| MATH 247 | Honours Applied Linear Algebra. ³ | 3 |
| MATH 251 | Honours Algebra 2. ³ | 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 |

¹ 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 before COMP 250 Introduction to Computer Science..

² 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..
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:

| Course | Title | Credits |
|----------|----------------------------------|---------|
| MATH 242 | Analysis 1. | 3 |
| MATH 254 | Honours Analysis 1. ¹ | 3 |

3 credits selected from:

| Course | Title | Credits |
|----------|---------------------------------|---------|
| MATH 235 | Algebra 1. | 3 |
| MATH 245 | Honours Algebra 1. ¹ | 3 |

¹ 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.,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:

| 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:

| 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:

| 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. ¹ | 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 |

¹ Not open to students who have taken MATH 354.

All MATH 500-level courses.

Other courses with the permission of the Department.