



FACULTY OF SCIENCE

## MATHEMATICS

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**Mathematics is the science of number, quantity and space and is often described as the "queen of the sciences."**

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Mathematics is essential to many fields, including data science, finance, medicine, technology, economics, engineering and the natural sciences. Math is everywhere! Math is used to secure your data when you enter it online, in fraud detection, to understand medical scans, in weather prediction, for modeling wildfires and for creating efficient networks for security systems or air traffic. Studying mathematics fosters strong critical thinking and problem-solving skills.

One branch of mathematics, called cryptography, helps to keep our information safe. When you use your credit card online, mathematics is used to encrypt this information so that a third party cannot read it. Mathematicians are also essential to national security, where their high-level problem-solving skills are used for encryption and decryption for intelligence gathering and computer security. Another branch of mathematics, called graph theory, is used to design and analyze networks, such as security, transportation or social networks.

At UWinnipeg, you have flexibility in designing your course of study. There are core courses that all mathematics majors must take, but you will also choose from a diverse group of additional courses, in areas such as topology, combinatorics and graph theory.

This program leads to a **Bachelor of Science degree (3-year, 4-year, or Honours) or a Bachelor of Arts degree (3-year or 4-year) with a major in mathematics**. In the Education program, mathematics can be used as a teachable major or a teachable minor. Students taking a degree in another major may choose to add a **minor** in mathematics as a secondary area of interest.

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### SAMPLE CAREERS

Graduates find employment in areas related to data science, finance, national security, cyber security, business, actuarial science, information technology, risk analysis and teaching. A mathematics degree is a great choice for students destined for medicine, dentistry, management, or law.

### SAMPLE COURSES

**Discrete Mathematics** is a first-year course that introduces students to mathematical reasoning, logical arguments, set theory, and number theory.

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**Cryptography and Other Applications of Algebra**, a second-year course, introduces algebraic structures and their applications to cryptography, data transmission, error-correcting codes and experimental design.

**Group Theory** is a third-year course that studies algebraic structures called groups. Symmetry groups are important in many branches of science and group theory is essential to public key cryptography and quantum mechanics.

### **MORE SAMPLE COURSES**

- **Number Theory**
- **Combinatorics**
- **Applied Math for Business & Administration**
- **Complex Analysis**
- **Graph Theory**
- **Math for Early/Middle Years Teachers**
- **Introduction to Real Analysis**

### **SAMPLE FIRST YEAR**

MATH-1103 (3) Introduction to Calculus I

MATH-1104 (3) Introduction to Calculus II

MATH-1201 (3) Linear Algebra I

MATH-1401 (3) Discrete Mathematics

RHET-1103(3) Academic Writing: Science or any other section of Academic Writing (if required)

6 credit hours Humanities

9 credit hours of electives

**NOTE:** *This sample first year is representative of the courses you may take. For many of our programs, you may choose another set of courses and still be well on your way to a degree. Also, for most programs you do not have to take 30 credit hours (five full courses) in your first year.*

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***“The faculty at UWinnipeg is some of the best in the country. And I also had a lot of opportunities to do research starting early in my degree, which is uncommon at larger universities.”***

*-Adam Borchert, BSc (Math, UWinnipeg), MSc (Math, Cambridge)*

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### **REQUIRED HIGH SCHOOL COURSES**

In addition to meeting the University of Winnipeg’s general admission requirements, you must have **Pre-Calculus Mathematics 40S**. Students who are lacking the prerequisite **Pre-Calculus Mathematics 40S** should enroll in **MATH-0041 AND MATH-0042, Mathematics Access I and II**, which together serve as a prerequisite replacement for **Pre-Calculus Mathematics 40S**.

### **HOW TO APPLY**

For details on application requirements and deadlines, and to apply online, please visit: [uwinnipeg.ca/apply](http://uwinnipeg.ca/apply)

For more information contact a student recruitment officer at [welcome@uwinnipeg.ca](mailto:welcome@uwinnipeg.ca) or 204.786.9844. *In any case where the University’s Academic Calendar and this fact sheet differ, the current Calendar takes precedence.*

### **CONTACT US**

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