



FACULTY OF SCIENCE

## BIOCHEMISTRY

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This degree combines knowledge and methodologies of biochemistry, cell biology, genetics, and microbiology with those of the physical sciences to investigate living systems.

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Biochemistry is the chemistry of life. It includes the structure and function of biologically important molecules, such as proteins, nucleic acids like DNA, carbohydrates, lipids, and many smaller biologically-active chemicals. Biochemistry graduates work in many different fields. These include research on the molecular basis of diseases, development of pesticides and medical diagnostics, forensics, immunology, environmental remediation, and physiology. Throughout this program (formerly known as Molecular Biology) important developments in the field are highlighted and future directions explored.

At The University of Winnipeg, Biochemistry is an interdisciplinary program. Most required courses are taught in the Departments of Biology and Chemistry. Students also take relevant courses in Physics, Mathematics, and Statistics along with elective courses. You will learn about the chemical make-up of cells, the regulation of metabolism, and the actions and control of genes. In addition, you will become familiar with the laboratory techniques used in this large area of science.

This program leads to a Bachelor of Science (3-year, 4-year, or Honours). ***Also, please see related fact sheet on “Chemistry.”***

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### SAMPLE CAREERS

Career opportunities for graduates of this program lie in life science-oriented industries such as food technology, pest control, and the design and manufacture of pharmaceuticals and diagnostics. Graduates may work in government labs or a variety of private industries. **A bachelor’s degree in biochemistry may qualify you to enter medicine, dentistry, or pharmacy.** It may also provide the foundation for further research and study at the graduate level.

### SAMPLE COURSES

**Cells and Cellular Processes** is a first-year Biology course that includes a consideration of introductory biochemistry, genetics, and cellular physiology. It relates metabolic processes to cellular function, describes mechanisms and patterns of inheritance, and introduces topics such as DNA technology.

**Intermediate Biochemistry I and II** are third-year courses that explore the relationship between the structure and function of important biomolecules, and examine the metabolic processes involved in the functioning of living organisms.

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**Molecular Enzymology** is a fourth-year course where students gain detailed knowledge of the structure, chemical function, and regulation of enzymes.

### **MORE SAMPLE COURSES**

- **Basic Principles of Chemical Reactivity**
- **Evolution, Ecology, and Biodiversity**
- **Genetics**
- **Methods in Biochemistry**
- **Molecular Cell Biology**
- **Molecular Genetics**
- **Organic Chemistry**

### **SAMPLE FIRST YEAR**

BIOL-1115(3) Cells and Cellular Processes  
BIOL-1116(3) Evolution, Ecology, and Biodiversity  
CHEM-1111(3) Introduction to the Chemical Properties of Matter  
CHEM-1112(3) Basic Principles of Chemical Reactivity  
MATH-1101(6) Introduction to Calculus OR  
MATH-1103 (3) Introduction to Calculus I and MATH 1104 (3) Introduction to Calculus II  
RHET-1103(3) Academic Writing: Science or any other section of Academic Writing (if required)  
STAT-1501(3) Elementary Biological Statistics I  
6 credit hours Humanities

*NOTE: This sample first year is recommended for a degree in Biochemistry. Calculus is required for both the B.Sc. 4-year and Honours Degrees. Biochemistry students must consult with Faculty Advisors in planning their programs.*

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***“As a University of Winnipeg student, I enjoyed the quality instruction, the opportunities for work and volunteer activities and the one-on-one contact with professors who really care.”***

-- Kristin Streuber (B.Sc. Hons. Biochemistry), who is now a physician in Winnipeg.

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### **REQUIRED HIGH SCHOOL COURSES**

In addition to meeting The University of Winnipeg's general admission requirements, you must have standing in **Chemistry 40S** AND EITHER **Pre-Calculus Mathematics 40S** OR **Applied Mathematics 40S**. **Pre-Calculus Mathematics 40S** is required for the 4-year or Honours B.Sc.

### **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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