



# THE UNIVERSITY OF WINNIPEG

For more information visit **[www.uwinnipeg.ca](http://www.uwinnipeg.ca)** or contact a student recruitment officer at **[welcome@uwinnipeg.ca](mailto:welcome@uwinnipeg.ca)** or **204.786.9844**. In any case where The University of Winnipeg Course Calendar and this fact sheet differ, the current Calendar takes precedence.

## Biochemistry

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

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. If you already have a general interest in biology or chemistry, you may find this program particularly interesting.

This program leads to a **3-year, 4-year, or Honours Bachelor of Science degree**.

### 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.

**Biology of Prokaryotes and Viruses** is a second-year course where students are introduced to the structure, physiology, and biochemistry of prokaryotes, such as bacteria, and of viruses. The lab features techniques of culture and identification of major groups of bacteria.

**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.

**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

### EXPERIMENTAL COURSES

Experimental Courses are new courses offered on a trial basis to gauge interest in various topics. Students who successfully complete any experimental course receive credit as indicated.

### BCHM-3504(6) Tropical and Infectious Diseases and HIV/AIDS

Students are team-taught by experts at The University of Nigeria, Nsukka. The biology and pathogenesis of eight tropical and infectious diseases (HIV/AIDS, malaria, tuberculosis, leishmaniasis, trypanosomiasis, onchocerciasis, guinea worm, leprosy) are covered. In addition, students engage in a relevant laboratory program on the various diseases; and field trips to local hospitals, health establishments, and clinics. Public awareness campaigns on various diseases (HIV/AIDS, and

sickle cell especially), to dispel the attendant taboos and myths, are part of the curriculum. Students tour research and development facilities in at least three south-eastern Nigerian states.

This course is part of, and imparts extra value and meaning to the U of W-U of Nigeria Exchange Program with its associated Linkage Program on diseases. It provides the opportunity for the visiting Canadian student to obtain relevant credit for his/her training and study in these diseases, a condition of importance to potential funding agencies.

### **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.

### **WHAT OUR STUDENTS SAY...**

"As a University of Winnipeg student, I have enjoyed the quality instruction, the opportunities for work and volunteer activities, and the one-on-one contact with professors who really care. The professors at The University of Winnipeg really try to connect with students and provide much more than just course help—giving advice about what to do after graduation, suggesting scholarships to apply for, and sharing their own experiences. Completing my Biochemistry Honours project at the St. Boniface Research Centre has been an excellent learning experience, giving me a glimpse of what research might look like at a higher level." - *Kristin Streuber (B.Sc. Hons. '05 Biochemistry) is studying Medicine at the University of Alberta.*

### **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.*

### **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 – Domestic Student**

Apply online at [uwinnipeg.ca](http://uwinnipeg.ca) or pick up an Application for Admission from your high school counsellor's office or the Admissions Office at The University of Winnipeg. To meet Scholarship deadline submit your application and \$80 application fee by **March 1st**.

### **HOW TO APPLY – International Student**

Apply online at [uwinnipeg.ca/index/intl-apply](http://uwinnipeg.ca/index/intl-apply) and submit all official documents by mail. To meet Scholarship deadline submit application, fee, and documents by **March 1st**. International application fee is \$100, which includes a one-time courier fee.

### **CONTACT US**

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