

# BIOCHEMISTRY (BCHM)

January 16, 2024

**Program Advisors:** Chair: Professor J. Hollett; Professor: D. Craig; Associate Professors: M. Eze, D. Vanderwel, T. Wood;  
**Instructor:** J. Galka

## DEGREES/PROGRAMS OFFERED

3 -Year BSc

3-Year BSc (Business Stream)

4 -Year BSc

4-Year BSc (Business Stream)

Honours BSc

## INTRODUCTION

This degree combines the information and methodologies of Biochemistry, Cell Biology, Genetics and Microbiology with the techniques of the physical sciences to investigate living systems. It is an Interdisciplinary Program which consists primarily of courses from the Departments of Biology and Chemistry. Students in the program will gain a thorough understanding of the molecular aspects of the structure, function and metabolism of living organisms. They will also obtain experience in up-to-date laboratory techniques and procedures. This is one of the most exciting areas of science at this time and students will be kept abreast of advances in the field and their impact on humans and other life forms.

The Program offers a 90 credit hour 3-Year BSc, a 120 credit hour 4-Year BSc and a 120 credit hour Honours BSc. Graduates will be well qualified to work in university, government, and other research laboratories or in the pharmaceutical and food industries. Graduates with a 4-Year BSc or Honours BSc could also proceed to graduate studies in the Life Sciences.

Students pursuing a 3-year or 4-year BSc in Biocwii9.5 (ood )0.5 (i) T90 ac (i)-5.9 50.004 (-)11. ques.y (l TJ-0.005 Tw [a )-14.6 (B)-8.6 (us)3.5 (i)-5.

**CHEM-3503(3)** Intermediate Biochemistry II: Intermediary Metabolism (or the former CHEM-3501(6))

**PHYS-1101(6)** Foundations of Physics I OR **PHYS-1301(6)** Introduction to Physics

Minimum 3 credit hours in additional core chemistry, selected from the following:

**CHEM-2102(3)** Thermodynamics and Kinetics

**CHEM-2103(3)** Atoms, Molecules and Spectroscopy

**CHEM-2302(3)** Quantitative Chemical Analysis

**CHEM-2401(3)** Inorganic Chemistry I

Minimum 3 credit hours selected from the following courses:

**PSYC-2101(3)** Introduction to Data Analysis

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**REQUIREMENTS FOR THE 3-YEAR BSc IN BIOCHEMISTRY  
WITH A BUSINESS STREAM**

hours. Students may not count both **BIOL-4111(6)** Biology Honours Thesis and **CHEM-4701(6)** Research Projects in Chemistry towards the Biochemistry major.

**Recommended:** Students planning on graduate studies should seriously consider taking either **BIOL-4111(6)** Biology Honours Thesis or **CHEM-4701(6)** Research Projects in Chemistry.

**Note:** Students should design their course selection in consultation with one of the Program Advisors.

### SUGGESTED PROGRAM OF STUDY

**Students must consult with Program Advisors in planning their programs.**

#### **Year 1**

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: Sciences (if required)  
STAT-1501(3) Elementary Biological Statistics I  
xxxx.xxxx(6) Humanities

#### **Year 2**

BIOL-2301(3) Genetics  
**BIOL-2902(3)** Biology of Bacteria and Archaea (formerly "Biology of the Prokaryotes and Viruses")  
CHEM-2202(3) Organic Chemistry I  
CHEM-2203(3) Organic Chemistry II  
One of:  
CHEM-2102(3) Thermodynamics and Kinetics  
CHEM-2103(3) Atoms, Molecules and Spectroscopy  
CHEM-2302(3) Quantitative Chemical Analysis  
CHEM-2401(3) Inorganic Chemistry I  
One of:  
PHYS-1301(6) Introduction to Physics  
PHYS-1101(6) Foundations of Physics I  
Electives\* 3 credit hours  
xxxx.xxxx(6) Humanities

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# REQUIREMENTS FOR AN HONOURS BSc IN BIOCHEMISTRY

<b>ADMISSION REQUIREMENT</b>	Students must consult with a Program Advisor in planning their studies.
<b>GRADUATION REQUIREMENT</b>	120 credit hours
Graduation G.P.A. Requirement:	To graduate with a BSc Honours, students must have a minimum GPA of 3.0 in all Chemistry, Biochemistry and Biology courses (calculated on all course attempts in Biology, Biochemistry and Chemistry) and a 2.75 GPA in all non-major courses (calculated as for a 3-year degree where F's are not included and, in the case of repeated courses, only the highest grade will be used).
<b>RESIDENCE REQUIREMENT</b>	
Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours
<b>GENERAL DEGREE REQUIREMENT</b>	
Humanities:	12 credit hours
Writing:	Minimum 3 credit hours of Academic Writing.
Indigenous:	3 credit hours in designated Indigenous requirement courses
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level. As a result, students must take a minimum of 78 credit hours at the 2000-level or above in order to not exceed the maximum number of introductory courses.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.
<b>MAJOR REQUIREMENT</b>	
Single Major:	Minimum 69 credit hours in the Major subject as per Required Courses list.
Double Major:	Minimum 69 credit hours of required courses and credit hours in Biochemistry program and specified number of credit hours in other Major; may vary depending on Interdisciplinary courses completed as they may be able to be credited to both Majors.

## Required courses:

<b>BIOL-1115(3)</b>	Cells and Cellular Processes (or the former BIOL-1111(6))	<b>CHEM-2202(3)</b>	Organic Chemistry I (or the former CHEM-2201(6))
<b>BIOL-1116(3)</b>	Evolution, Ecology and Biodiversity (or the former BIOL-1111(6))	<b>CHEM-2203(3)</b>	Organic Chemistry II (or the former CHEM-2201(6))
<b>BIOL-2301(3)</b>	Genetics (or the former BIOL-3301(3))	<b>CHEM-2302(3)</b>	Quantitative Chemical Analysis
<b>BIOL-2902(3)</b>	Biology of Bacteria and Archaea (formerly "Biology of the Prokaryotes and Viruses")	<b>CHEM-2401(3)</b>	Inorganic Chemistry I
<b>BIOL-3221(3)</b>	Cell Biology	<b>CHEM-3502(3)</b>	Intermediate Biochemistry I: Structure, Function, and Energetics of Biomolecules (or the former CHEM-3501(6))
<b>BIOL-3303(3)</b>	Molecular Genetics and Genomics (or the former BIOL-4302(3))	<b>CHEM-3503(3)</b>	Intermediate Biochemistry II: Intermediary Metabolism (or the former CHEM-3501(6))
<b>BIOL-4111(6)</b>	Biology Honours Thesis	<b>CHEM-4502(3)</b>	Molecular Enzymology
<b>OR CHEM-4701(6)</b>	Research Projects in Chemistry	<b>CHEM-4506(3)</b>	Methods in Biochemistry (or the former CHEM-4505(3))
<b>BIOL-4502(3)</b>	Molecular Cell Biology	<b>MATH-1101(6)</b>	Introduction to Calculus or the equivalent
<b>CHEM-1111(3)</b>	Introduction to the Chemical Properties of Matter (or the former CHEM-1101(6))	<b>MATH-1103 (3)</b>	Introduction to Calculus I
<b>CHEM-1112(3)</b>	Basic Principles of Chemical Reactivity (or the former CHEM-1101(6))	<b>AND MATH-1104 (3)</b>	Introduction to Calculus II
<b>CHEM-2102(3)</b>	Thermodynamics and Kinetics	<b>PHYS-1101(6)</b>	Foundations of Physics I
		<b>OR PHYS-1301(6)</b>	Introduction to Physics

## Minimum 3 credit hours selected from the following physiology courses:

<b>BIOL-3163(3)</b>	Plant Anatomy and Physiology
<b>BIOL-3602(3)</b>	Comparative Animal Physiology I (or the former BIOL-3601(6))
<b>BIOL-3603(3)</b>	Comparative Animal Physiology II (or the former BIOL-3601(6))
<b>BIOL-4902(3)</b>	Microbial Physiology

## Minimum 3 credit hours selected from the following statistics courses:

<b>PSYC-2101(3)</b>	Introduction to Data Analysis
<b>STAT-1301 (3)</b>	<b>Statistical Analysis I</b>
<b>STAT-1302 (3)</b>	<b>Statistical Analysis II</b>
<b>STAT-1501(3)</b>	Elementary Biological Statistics I

6 additional credit hours from Biology and/or Biochemistry and/or Chemistry at or above the 2000 level (with the exception of the former CHEM-2501(3), CHEM-2601(6) and CHEM-2801(3)) to bring the total number of Biology, Biochemistry and Chemistry courses to 69 credit hours. Students may not count both **BIOL-4111(6)** Biology Honours Thesis and **CHEM-4701(6)** Research Projects in Chemistry towards the Biochemistry major.

**Note:** Students should design their course selection in consultation with one of the Program Advisors.



## COURSE LISTINGS

Students should consult Web Advisor or the appropriate Timetable on the website for courses to be offered in an upcoming term. A number of senior courses are offered on a rotation basis and are given in alternate years. Students are advised to consult with the Chair, Department of Chemistry in advance when planning their curriculum.

**MULT/BCHM-2119(3):** Topics in Diseases and Policy

**MULT/BCHM-4119(4.5):** Topics in Diseases and Policy

## COURSE DESCRIPTIONS

All course descriptions for all undergraduate programs can now be found in one large PDF called "All Course Descriptions" in the "Academic Calendar" section of the University website:

<http://uwinnipeg.ca/academics/calendar/index.html>