HONOURS BSC BIOPHARMACEUTICAL SCIENCE

This interdisciplinary program combines basic studies from areas such as molecular biology, biochemistry, pharmacology and organic chemistry, and courses designed especially for biopharmaceutical sciences' students.

The goal is to produce graduates who, after further specialization, will be ready to work in an interdisciplinary environment at the interfaces between biology, chemistry and health-related sciences.

Two options are offered: genomics (for students interested in the genetic and biological aspects of the field) and medicinal chemistry (for those fascinated by organic and biological chemistry). Genomics focuses on molecular biology and the function of genes and proteins in the study of diseases. Medicinal chemistry emphasizes organic and biological chemistry and their applications to the production of new and better pharmaceuticals.

Graduates from both streams are well positioned to enter all sectors of the growing health sector, from biomedical research and biopharmaceuticals development to drug manufacturing and regulation. They also meet most requirements for entry into professional programs such as medicine, law, education and administration.

This program is offered in English and in French.

Program Requirements

Co-operative education is available with this program.

The French immersion stream is available with this program.

Requirements for this program have been modified. Please consult the 2024-2025 calendars (http://catalogue.uottawa.ca/en/archives/) for the previous requirements.

Basic Skills		
3 optional course units in English (ENG) at the 1000 or 2000 level		3 Units
Compulsory Courses at the 1000 level		
BIO 1130	Introduction to Organismal Biology	3 Units
BIO 1140	Introduction to Cell and Molecular Biology	3 Units
CHM 1311	Principles of Chemistry	3 Units
CHM 1321	Organic Chemistry I	3 Units
MAT 1330	Calculus for the Life Sciences I	3 Units
MAT 1332	Calculus for the Life Sciences II	3 Units
PHY 1321	Principles of Physics I	3 Units
Compulsory Courses at the 2000 level		
BCH 2333	Introduction to Biochemistry	3 Units
BIO 2133	Genetics	3 Units
BPS 2110	Introduction to Biopharmaceutical Science	3 Units
CHM 2120	Organic Chemistry II	3 Units
CHM 2123	Laboratory of Organic Chemistry II	3 Units
CHM 2132	Physical Chemistry for the Life Sciences	3 Units
MAT 2379	Introduction to Biostatistics	3 Units
PHI 2396	Bioethics	3 Units
Compulsory Courses at the 3000 level		
BCH 3120	General Intermediary Metabolism	3 Units
BIO 3170	Molecular Biology	3 Units
Compulsory Courses at the 4000 level		
BPS 4900	Seminar	3 Units
PHA 4107	Introductory Pharmacology - Drugs and Living Systems	3 Units
Optional Courses		
3 course units from:		3 Units
GEO 1111	Introduction to Earth Systems	
PHY 1322	Principles of Physics II	
3 course units from:		3 Units
BCH 3356	Molecular Biology Laboratory	
BIO 3151	Molecular Biology Laboratory	
42 course units from the Medicinal Chemistry Option or the Genomics Option		42 Units
Elective Courses		
6 elective course units from the Faculty of Arts, the Faculty of Education, the Faculty of Law, the Faculty of Social Sciences or the Telfer School of Management		6 Units
6 elective course units [1]		6 Units
Total:		**120 Units**

Medicinal Chemistry Option		
CHM 2311	Introduction to Structure and Bonding	3 Units
CHM 2354	Analytical Chemistry	3 Units
CHM 3120	Intermediate Organic Chemistry	3 Units
CHM 3122	Applications of Spectroscopy in Chemistry	3 Units
BPS 4125	Medicinal Chemistry	3 Units
One option from the following:		9 Units
Option 1: Honours Project		
BPS 4006	Honours Project	
Option 2: Honours Project Substitution		
BPS 4126	Synthetic and Medicinal Chemistry Laboratory	
and 6 optional course units from the list of optional courses for the Medicinal Chemistry Option		
3 course units from:		3 Units
CHM 3126	Laboratory of Organic Chemistry	
CHM 3127	Laboratory of Organic Chemistry – Research Option	
3 course units from:		3 Units
BIM 4316	Modern Bioanalytical Chemistry	
CHM 4354	Principles of Instrumental Analysis	
9 optional course units from the list of optional courses for the Medicinal Chemistry Option		9 Units
3 optional course units at the 3000 or 4000 level offered by the Faculty of Science		3 Units
Total:		**42 Units**

Genomics Option		
ITI 1120	Introduction to Computing I	3 Units
BIO 2135	Animal Form and Function	3 Units

BIO 3102	Molecular Evolution	3 Units
BIO 3119	Population Genetics	3 Units
BPS 3101	Genomics	3 Units
BPS 4101	Human Genome Structure and Function	3 Units
BPS 4104	Bioinformatics Laboratory	3 Units
One option from the following:		9 Units
Option 1: Honours Project		
BPS 4006	Honours Project	
Option 2: Honours Project Substitution		
BPS 4127	Advanced Techniques in Biosciences	
and 6 optional course units from the list of optional courses for the Genomics Option at the 3000 or 4000 level		
9 optional course units from the list of optional courses for the Genomics Option		9 Units
3 optional course units at the 3000 or 4000 level offered by the Faculty of Science		3 Units
Total:		**42 Units**

Note(s)

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For students intending to pursue graduate studies in Chemistry, it is highly recommended to take 6 of their elective course units from the list of optional courses in Medicinal Chemistry.

List of Optional Courses

Medicinal Chemistry Option:

BCH 3125	Protein Structure and Function	3 Units
BIM 4316	Modern Bioanalytical Chemistry	3 Units
BPS 3350	Transition Metal Chemistry	3 Units
BPS 4103	Selected Topics in Biopharmaceutical Science	3 Units
BPS 4111	Directed Studies in Biopharmaceutical Science	3 Units
BPS 4121	Biosynthesis and Natural Product Derived Medicines	3 Units
BPS 4126	Synthetic and Medicinal Chemistry Laboratory	3 Units
BPS 4129	Advanced Chemical Biology	3 Units
BPS 4131	Advanced Biopharmaceutical Science	3 Units
CHM 3350	Transition Metal Chemistry	3 Units
CHM 4120	Advanced Organic Chemistry	3 Units
CHM 4139	Enzyme Chemistry and Biocatalysis	3 Units
CHM 4155	Polymer and Applied Chemistry	3 Units
CHM 4317	Organometallic Chemistry	3 Units
CHM 4319	Bio-Inorganic Chemistry	3 Units
CHM 4325	Advanced Organic Synthesis and Reaction Mechanisms	3 Units
CHM 4328	Special Topics in Organic Chemistry	3 Units
CHM 4354	Principles of Instrumental Analysis	3 Units

Genomics Option:

BCH 3125	Protein Structure and Function	3 Units
BCH 3346	Biochemistry Laboratory II	3 Units
BCH 4122	Structural Biology of Proteins	3 Units
BCH 4125	Cellular Regulation and Control	3 Units
BCH 4172	Topics in Biotechnology	3 Units
BCH 4188	Synthetic Biology	3 Units
BIM 4103	Selected Topics in Biomedical Science	3 Units
BIM 4316	Modern Bioanalytical Chemistry	3 Units
BIO 2137	Introduction to Plant Science	3 Units
BIO 3124	General Microbiology	3 Units
BIO 3126	General Microbiology Laboratory	3 Units
BIO 3140	Plant Physiology and Biochemistry	3 Units
BIO 3147	Animal Developmental Biology	3 Units
BIO 3152	Cell Biology Laboratory	3 Units
BIO 3153	Cell Biology	3 Units
BIO 3302	Animal Physiology II	3 Units
BIO 3303	Animal Physiology I	3 Units
BIO 4109	Advanced Topics in Animal Development	3 Units
BIO 4115	Topics in Molecular Genetics	3 Units
BIO 4127	Comparative Endocrinology	3 Units
BIO 4144	Plant Molecular Biology	3 Units
BIO 4145	Eukaryotic Microbiology	3 Units
BPS 3102	Principles of Toxicology and Pharmacology	3 Units
BPS 4102	Pharmaceuticals: Federal and International Regulations	3 Units
BPS 4103	Selected Topics in Biopharmaceutical Science	3 Units
BPS 4105	Human Toxicology and Environmental Health	3 Units
BPS 4111	Directed Studies in Biopharmaceutical Science	3 Units
BPS 4123	Phytomedicines and Natural Product Drugs	3 Units
BPS 4129	Advanced Chemical Biology	3 Units
BPS 4131	Advanced Biopharmaceutical Science	3 Units
MIC 4100	Pathogens and the Environment	3 Units
MIC 4124	Pathogenic Bacteriology	3 Units
MIC 4125	Immunology	3 Units
MIC 4126	Virology	3 Units
PHS 3341	Physiology of Sensation, Regulation Mechanisms, Movement and Reproduction	3 Units
PHS 3342	Physiological Regulation of Intake, Distribution, Protection and Elimination	3 Units