HONOURS BSC BIOCHEMISTRY AND BASC CHEMICAL ENGINEERING (BIOTECHNOLOGY)

Biochemistry

Biochemistry is the chemistry of life. It provides the foundation for understanding all biological processes as well as the molecular basis and treatment of human disease.

The biochemistry bachelor's provides you with the education you need to play a leading role in new and exciting areas of medical research. You will be exposed to cutting-edge research and knowledge. Our program prepares you for graduate studies and for an academic or research career in the medical sciences. What's more, biochemistry provides an excellent foundation for further studies in medicine and other areas of health care.

You can choose an Honours BSc in Biochemistry, a major or a minor.

If you want to pursue a career in experimental biochemistry, choose the Honours program. If you prefer a basic biochemistry education, choose a major. And if you want to focus on another discipline but are interested in biochemistry, choose a minor.

If you have a particular interest in microorganisms and the role that the immune system plays in health and disease, you can also choose an Honours BSc in biochemistry with an option in microbiology and immunology. We also offer an integrated biotechnology program that lets you combine studies in biochemistry and chemical engineering and receive both a BSc in biochemistry and a BASc in chemical engineering in five years.

As for the language of instruction, compulsory courses and many optional course units are available in either English or French.

If you choose the Honours in Biochemistry, you have the opportunity to complete a full-year research project under the supervision of a professor from the departments of Chemistry and Biomolecular Sciences, Biology, Physics, or Biochemistry, Microbiology and Immunology, or under the supervision of an affiliated principle investigator from one of the many research institutes in the National Capital Region. Given the breadth of research expertise within our program, you can conduct research in many areas of modern biomedicine, including biochemistry, microbiology, immunology, chemical biology, molecular biology, cell biology, proteomics, genomics, systems biology and bioinformatics.

Chemical Engineering

Chemical engineering is at the intersection of many disciplines, linking knowledge of basic and applied sciences, economics, and health and safety. Chemical engineering graduates use a series of operations to sustainably process raw natural materials into finished products. They work in any number of industries, and during their careers, they may face a variety of challenges, including optimizing processes, monitoring pollution, converting renewable energy, processing foods and drugs, and manufacturing new materials.

This program is offered in English and in French.

Program Requirements

The minimum CGPA required to be on good academic standing is 6.0.

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 2023-2024 calendars (https://catalogue.uottawa.ca/en/archives/) for the previous requirements.

Basic Skills		
ENG 1112	Technical Report Writing	3 Units
Compulsory First-Year Courses:		
BIO 1130	Introduction to Organismal Biology	3 Units
BIO 1140	Introduction to Cell and Molecular Biology	3 Units
CHG 1125	Chemical Engineering Fundamentals [1]	3 Units
CHG 1371	Numerical Methods and Engineering Computation in Chemical Engineering	3 Units
CHM 1311	Principles of Chemistry	3 Units
CHM 1321	Organic Chemistry I	3 Units
GNG 1103	Introduction to Engineering Design	3 Units
GNG 1105	Engineering Mechanics	3 Units
ITI 1120	Introduction to Computing I	3 Units
MAT 1320	Calculus I	3 Units
MAT 1322	Calculus II	3 Units
MAT 1341	Introduction to Linear Algebra	3 Units
PHY 1122	Fundamentals of Physics II	3 Units
Compulsory Second-Year Courses:		
BCH 2333	Introduction to Biochemistry	3 Units
BIO 2133	Genetics	3 Units
CHM 2120	Organic Chemistry II	3 Units
CHM 2123	Laboratory of Organic Chemistry II	3 Units
CHM 2330	Physical Chemistry: Introduction to the Molecular Properties of Matter	3 Units
CHM 2354	Analytical Chemistry	3 Units
MAT 2384	Ordinary Differential Equations and Numerical Methods	3 Units
3 course units from:		3 Units
ECO 1192	Engineering Economics	
GNG 2101	Introduction to Product Development for Engineers and Computer Scientists	
Compulsory Third-Year Courses:		
BCH 3120	General Intermediary Metabolism	3 Units
BCH 3125	Protein Structure and Function	3 Units
BCH 3170	Molecular Biology	3 Units
BCH 3346	Biochemistry Laboratory II	3 Units
BCH 3356	Molecular Biology Laboratory	3 Units
BIO 3124	General Microbiology	3 Units
BIO 3153	Cell Biology	3 Units
CHG 2312	Fluid Flow	3 Units
CHG 2314	Heat Transfer Operations	3 Units
CHG 2317	Introduction to Chemical Process Analysis and Design	3 Units

CHG 2324	Fundamentals and Applications of Chemical Engineering Thermodynamics	3 Units
MAT 2322	Calculus III for Engineers	3 Units
3 course unit from:		3 Units
HIS 2129	Technology, Society and Environment Since 1850	
PHI 2394	Scientific Thought and Social Values	
Compulsory Fourth-Year Courses:		
BCH 4172	Topics in Biotechnology	3 Units
BCH 4932	Biochemistry Seminar [2]	3 Units
CHG 3111	Unit Operations	3 Units
CHG 3112	Process Synthesis, Design and Economics	3 Units
CHG 3122	Chemical Engineering Practice	3 Units
CHG 3127	Chemical Reaction Engineering	3 Units
CHG 3305	Advanced Materials in Chemical Engineering	3 Units
CHG 3316	Transport Phenomena	3 Units
CHG 3326	Principles of Phase Equilibria and Chemical Reaction Equilibria	3 Units
CHG 3335	Process Control	3 Units
One option from the following:		9 Units
Option 1: Honours Project		
BCH 4040	Honours Research - Biochemistry [3]	
Option 2: Honours Project Substitution		
9 course units among the 3000 or 4000 level courses in biochemistry (BCH), biology (BIO), biopharmaceutical sciences (BPS), cellular and molecular medicine (CMM), chemistry (CHM), pharmacology (PHA), physiology (PHS), microbiology and immunology (MIC)		
6 course units from:		6 Units
BCH 4101	Human Genome Structure and Function	
BCH 4116	Analytical Biochemistry	
BCH 4122	Structural Biology of Proteins [4]	
BCH 4123	Pathological Biochemistry	
BCH 4124	Carbohydrates and Glycobiology	
BCH 4125	Cellular Regulation and Control	
BCH 4126	Structural Biology of Membranes	
BCH 4188	Synthetic Biology [4]	
BCH 4300	Selected Topics in Biochemistry	
BPS 3101	Genomics	
BPS 4121	Biosynthesis and Natural Product Derived Medicines	
BPS 4129	Advanced Chemical Biology	
CHM 4139	Enzyme Chemistry and Biocatalysis	
Compulsory Fifth-Year Courses:		
CHG 3337	Data Collection and Interpretation	3 Units
CHG 4116	Chemical Engineering Laboratory	3 Units
CHG 4250	Plant Design Project	9 Units
CHG 4307	Process Risk Management and Sustainability	3 Units
CHG 4343	Computer-Aided Design in Chemical Engineering	3 Units
CHG 4381	Biochemical Engineering	3 Units
GNG 4170	Engineering Law	3 Units
One option from the following:		6 Units
Option 1:		
CHG 4901	Thesis and seminars I	
CHG 4902	Thesis and seminars II	
Option 2:		
CHG 4901	Thesis and seminars I	
3 course units of technical electives [5]		
Option 3:		
6 course units of technical electives [5]		
Electives		
6 complementary electives course units at the undergraduate level [6]		6 Units
Total:		**189 Units**

Note(s)

1

CHG 1125 must be taken during the first two years; it is recommended that this course be taken the first year.

2

This course runs from September to April.

3

The research project is highly recommended for students who intend to pursue a career in research, but a CGPA of 6.5 or greater or with a GPA of 6.5 or greater calculated from the two most recent years of full-time study in the Honours in Biochemistry program (minimum of 54 units including all compulsory 3000 level courses). This course runs from September to April.

4

This course may not be available every year.

5

Consult the list of technical electives in the regular Chemical Engineering program.

6

Complementary elective courses at the undergraduate level includes GNG 2101, GNG 4170, and GNG 4120, but excludes all courses offered by the Faculty of Science and the Faculty of Engineering as well as all courses that have a science, mathematics or engineering content.
For a complete list of courses please refer to the list of complementary elective courses (https://www2.uottawa.ca/faculty-engineering/undergraduate-studies/courses-and-course-sequences/complementary-electives/) on the Faculty of Engineering website.