HONOURS BSC IN BIOCHEMISTRY / BASC IN CHEMICAL ENGINEERING (BIOTECHNOLOGY) - BIOMEDICAL ENGINEERING OPTION

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.

This program is offered in English and in French.

Program Requirements
Co-operative education is available with this program.

The extended French stream is available with this program.

This program is currently under revision. At this time, we are not accepting applications.

Compulsory First-Year Courses:
- **BIO 1130** Introduction to Organismal Biology 3 Units
- **BIO 1140** Introduction to Cell Biology 3 Units
- **CHG 1125** Chemical Engineering Fundamentals 3 Units
- **CHM 1311** Principles of Chemistry 3 Units
- **CHM 1321** Organic Chemistry I 3 Units
- **MAT 1320** Calculus I 3 Units
- **MAT 1322** Calculus II 3 Units
- **MAT 1341** Introduction to Linear Algebra 3 Units
- **PHY 1121** Fundamentals of Physics I 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
- **ECO 1192** Engineering Economics 3 Units
- **ENG 1112** Technical Report Writing 3 Units
- **GNG 1106** Fundamentals of Engineering Computation 3 Units
- **MAT 2377** Probability and Statistics for Engineers 3 Units
- **MAT 2384** Ordinary Differential Equations and Numerical Methods 3 Units

Compulsory Third-Year Courses:
- **BCH 3120** General Intermediary Metabolism 3 Units
- **BCH 3125** Protein Structure and Function 3 Units
- **BCH 3170** Molar Biology 3 Units
- **BCH 3346** Biochemistry Laboratory II 3 Units
- **BCH 3356** Molecular Biology Laboratory 3 Units
- **BIO 3124** General Microbiology 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

3 course units from:
- **HIS 2129** Technology, Society and Environment Since 1800 3 Units
- **PHI 2394** Scientific Thought and Social Values 3 Units

Compulsory Fourth-Year Courses:
- **BCH 4172** Topics in Biotechnology 3 Units
- **BCH 4932** Biochemistry Seminar 3 Units

One option from the following: 9 Units

Option 1: Honours Project
- **BCH 4040** Honours Research - Biochemistry

Option 2: Honours Project Substitution
Honours BSc in Biochemistry / BASc in Chemical Engineering (Biotechnology) - Biomedical Engineering Option

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)

3 course units from: 3 Units
- BPS 3101 Genomics
- BCH 4101 Human Genome Structure and Function

6 course units from: 6 Units
- BCH 4122 Structural Biology of Proteins
- BCH 4125 Cellular Regulation and Control
- BCH 4188 Nucleic Acids - Structure and Functions
- BCH 4300 Selected Topics in Biochemistry

3 course units from: 3 Units
- CHG 3111 Unit Operations
- CHG 3112 Process Synthesis, Design and Economics
- CHG 3122 Chemical Engineering Practice
- CHG 3127 Chemical Reaction Engineering
- CHG 3316 Transport Phenomena
- CHG 3324 Fundamentals and Applications of Chemical Engineering Thermodynamics
- CHG 3326 Principles of Phase Equilibria and Chemical Reaction Equilibria
- CHG 3331 Application of Mathematical Methods to Chemical Engineering
- CHG 3337 Data Collection and Interpretation

Compulsory Fifth-Year Courses:
- CHG 3335 Process Control
- CHG 4116 Chemical Engineering Laboratory
- CHG 4244 Plant Design Project

6 course units from: 6 Units
- CHG 4900 Thesis and seminars
- CHG 4305 Advanced Materials in Chemical Engineering
- CHG 4307 Clean Processes and Sustainable Development
- CHG 4343 Computer-Aided Design in Chemical Engineering
- CHG 4381 Biochemical Engineering
- GNG 4170 Engineering Law

3 course units of technical electives 3 Units

Total: 189 Units

Note(s)

1. CHG 1125 must be taken in first or second year; first year is recommended.
2. It is recommended that GNG 1106 be taken in first or second year.
3. For a complete list of complementary studies electives, consult the Faculty of Engineering’s website.
4. This course runs from September to April.
5. The research project is highly recommended for students who intend to pursue a career in research, but a CGPA of 7.0 is required to be eligible for the project. This course runs from September to April.
6. This course may not be available every year.
7. Consult the list of technical electives for the Biomedical Engineering option in the regular Chemical Engineering program.