HONOURS BSC IN BIOCHEMISTRY / BASC IN 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 Biotechnology, 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 3356</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BIO 3124</td>
<td>General Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>BIO 3153</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Compulsory Fourth-Year Courses:**

- 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 3316  Transport Phenomena                    | 3 Units |
- CHG 3324  Fundamentals and Applications of Chemical Engineering Thermodynamics | 3 Units |
- CHG 3326  Principles of Phase Equilibria and Chemical Reaction Equilibria | 3 Units |
- CHG 3331  Application of Mathematical Methods to Chemical Engineering | 3 Units |
- CHG 3335  Process Control                        | 3 Units |
- BCH 4172  Topics in Biotechnology               | 3 Units |
- BCH 4932  Biochemistry Seminar                  | 4 Units |

One option from the following: 9 Units

**Option 1: Honours Project**

- BCH 4040 Honours Research - Biochemistry 5

**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)

- 3 course units of complementary studies electives 3

- 6 course units from:
  - BPS 3101 Genomics 6
  - BCH 4101 Human Genome Structure and Function 6
  - BCH 4125 Cellular Regulation and Control 6
  - BCH 4116 Analytical Biochemistry
  - BCH 4122 Structural Biology of Proteins 7
  - BCH 4123 Pathological Biochemistry
  - BCH 4124 Carbohydrates and Glycobiology
  - BCH 4188 Nucleic Acids - Structure and Functions 7
  - BPS 4300 Selected Topics in Biochemistry
  - 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 4244  Plant Design Project                  | 6 Units |
- CHG 4305  Advanced Materials in Chemical Engineering | 3 Units |
- CHG 4307  Clean Processes and Sustainable Development | 3 Units |
- CHG 4343  Computer-Aided Design in Chemical Engineering | 3 Units |
- CHG 4381  Biochemical Engineering               | 3 Units |
- GNG 4170  Engineering Law                       | 3 Units |

6 course units from: 6 Units

**CHG 4900 Thesis and seminars or 6 course units of technical electives 8** 3 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. It is recommended that GNG 1106 be taken in first or second year.
3. For a complete list of course units 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 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.
6. A maximum of 3 course units may be selected amongst these courses.
7. This course may not be available every year.
8. Consult the list of technical electives in the regular Chemical Engineering program.