# Biotechnology – Specialization (Science) – Bachelor of Science (Honours)

**BTEC-P-BSH**

**Subject:** Administered by the Department of Biology.

**Plan:** Consists of 90.00 units as described below.

**Program:** The Plan, with sufficient electives to total 120.00 units, will lead to a Bachelor of Science (Honours) Degree.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>1. Core</strong></td>
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<td></td>
<td><strong>- CORE PROGRAM -</strong></td>
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<tr>
<td><strong>A. Complete the following:</strong></td>
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<tr>
<td>BIOL 102</td>
<td>Fundamentals of Biology: Molecular and Cell Biology</td>
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<tr>
<td>BIOL 103</td>
<td>Fundamentals of Biology: Organisms to Ecosystems</td>
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<td><strong>B. Complete the following:</strong></td>
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<tr>
<td>BIOL 205</td>
<td>Mendelian and Molecular Genetics</td>
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<tr>
<td>BIOL 206</td>
<td>Evolutionary Genetics</td>
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<td><strong>C. Complete the following:</strong></td>
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<tr>
<td>BIOL 212</td>
<td>Scientific Methods in Biology</td>
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<td><strong>D. Complete 6.00 units from the following:</strong></td>
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<tr>
<td>BIOL 334</td>
<td>Comparative Biochemistry</td>
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</tr>
<tr>
<td>BIOL 339</td>
<td>Animal Physiology</td>
<td></td>
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<tr>
<td>BIOL 341</td>
<td>Plant Physiology</td>
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<td><strong>E. Complete the following:</strong></td>
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<tr>
<td>BIOL 330</td>
<td>Cell Biology</td>
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<tr>
<td>BCHM 218</td>
<td>Molecular Biology</td>
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<td><strong>F. Complete 3.00 from the following:</strong></td>
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<tr>
<td>BIOL 401</td>
<td>Experimental Approaches to Animal Physiology</td>
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<tr>
<td>BIOL 402</td>
<td>Experiments in Plant Physiology</td>
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<td><strong>G. Complete 3.00 units from the following:</strong></td>
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<tr>
<td>BIOL 403</td>
<td>Experimental Techniques in Biology</td>
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<tr>
<td>BIOL 404</td>
<td>Techniques in Molecular Biology</td>
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<tr>
<td><strong>H. Complete 3.00 units from the following:</strong></td>
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<tr>
<td>BCHM 441</td>
<td>Current Topics in Biochemistry</td>
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<tr>
<td>BIOL 360</td>
<td>Biotechnology and Society</td>
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</tr>
<tr>
<td>BIOL 441</td>
<td>Molecular Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 503</td>
<td>Plant Biotechnology</td>
<td></td>
</tr>
<tr>
<td>BIOL 507</td>
<td>Biotechnology</td>
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<tr>
<td><strong>- OTHER CORE -</strong></td>
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<td><strong>I. Complete the following:</strong></td>
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<tr>
<td>CHEM 112</td>
<td>General Chemistry</td>
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<td><strong>J. Complete 6.00 units from the following:</strong></td>
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<tr>
<td>MATH 121</td>
<td>Differential and Integral Calculus</td>
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<tr>
<td>MATH 120</td>
<td>Differential and Integral Calculus</td>
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<tr>
<td>MATH 123</td>
<td>Differential and Integral Calculus I &amp; MATH 124 and Differential and Integral Calculus II</td>
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<td><strong>K. Complete the following:</strong></td>
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<tr>
<td>BIOL 243</td>
<td>Introduction to Statistics</td>
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<tr>
<td>or STAT 26</td>
<td>Statistics and Probability II</td>
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<td><strong>2. Option</strong></td>
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<tr>
<td><strong>A. Complete 6.00 units from the following:</strong></td>
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<td>6.00</td>
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<tr>
<td>BIOL 334</td>
<td>Comparative Biochemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM at the 200-level or above</td>
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<td><strong>B. Complete 12.00 units from the following course list:</strong></td>
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<td>12.00</td>
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<tr>
<td>BTEC_Biology</td>
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<td><strong>C. Complete 3.00 units from one of the following options:</strong></td>
<td></td>
<td>3.00</td>
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<tr>
<td><strong>i. Biology Option:</strong></td>
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<tr>
<td>a. Complete 3.00 units from the following:</td>
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<tr>
<td>BIOL 200</td>
<td>Diversity of Life</td>
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<td><strong>ii. Biomedical and Molecular Science Option:</strong></td>
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<tr>
<td>a. Complete 3.00 units from the following:</td>
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<tr>
<td>BCHM 270</td>
<td>Biochemical Basis of Health and Disease</td>
<td></td>
</tr>
<tr>
<td>MICR 221</td>
<td>Fundamental Microbiology</td>
<td></td>
</tr>
<tr>
<td>MICR 270</td>
<td>Infection, Immunity and Inflammation</td>
<td></td>
</tr>
<tr>
<td>PHGY 215</td>
<td>Principles of Mammalian Physiology I</td>
<td></td>
</tr>
<tr>
<td>PHGY 216</td>
<td>Principles of Mammalian Physiology II</td>
<td></td>
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<tr>
<td><strong>D. Complete 18.00 units from one of the following options:</strong></td>
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<td>18.00</td>
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<tr>
<td><strong>i. Course Option:</strong></td>
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<tr>
<td>a. Complete 18.00 units from the following course lists:</td>
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<td>BTEC_Biology</td>
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<td>BTEC_Options</td>
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<td><strong>ii. Research Option:</strong></td>
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<tr>
<td>a. Complete 12.00 units from the following:</td>
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<tr>
<td>BIOL 537</td>
<td>Research in Biology</td>
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<tr>
<td>or BIOL 54</td>
<td>Research in Biotechnology</td>
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<td>b. Complete 6.00 units from the following course lists:</td>
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<td>BTEC_Biology</td>
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**Electives**
Elective Courses  

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<tr>
<th>Code</th>
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<tr>
<td>BIOL 360</td>
<td>Biotechnology and Society</td>
<td>3.00</td>
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<tr>
<td>BIOL 401</td>
<td>Experimental Approaches to Animal Physiology</td>
<td>3.00</td>
</tr>
<tr>
<td>BIOL 402</td>
<td>Experiments in Plant Physiology</td>
<td>3.00</td>
</tr>
<tr>
<td>BIOL 403</td>
<td>Experimental Techniques in Biology</td>
<td>3.00</td>
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<tr>
<td>BIOL 404</td>
<td>Techniques in Molecular Biology</td>
<td>3.00</td>
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<tr>
<td>BIOL 409</td>
<td>Bioremediation</td>
<td>3.00</td>
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<tr>
<td>BIOL 430</td>
<td>Molecular Genetics of Development</td>
<td>3.00</td>
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<tr>
<td>BIOL 431</td>
<td>Cellular Basis of Adaptation</td>
<td>3.00</td>
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<tr>
<td>BIOL 432</td>
<td>Computation and Big Data in Biology</td>
<td>3.00</td>
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<tr>
<td>BIOL 441</td>
<td>Molecular Genetics</td>
<td>3.00</td>
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<tr>
<td>BIOL 501</td>
<td>Recent Research in Molecular</td>
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<tr>
<td>BIOL 502</td>
<td>Plant Cell Responses to Environmental Stress</td>
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<tr>
<td>BIOL 503</td>
<td>Plant Biotechnology</td>
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<tr>
<td>BIOL 504</td>
<td>Extremophiles</td>
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<tr>
<td>BIOL 505</td>
<td>Cell Signaling in Development and Disease 8.00</td>
<td>3.00</td>
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<tr>
<td>BIOL 506</td>
<td>Biochemical Adaptations to Life Under Extreme Conditions</td>
<td>3.00</td>
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<tr>
<td>BIOL 507</td>
<td>Biotechnology</td>
<td>3.00</td>
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<tr>
<td>BIOL 508</td>
<td>Biology of the Cell Cycle</td>
<td>3.00</td>
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</table>

3. Substitutions
A. MATH 126 may be substituted for MATH 121 or MATH 120 with prior approval from the Chair of Undergraduate Studies in the Department of Biology.

4. Notes
A. Each of BIOL 334, BIOL 339, BIOL 341, BIOL 401, BIOL 402, BIOL 403, BIOL 404, BIOL 441, and BCHM 441 can be used as either a Core Course or an Option Course, but not both.
B. BIOL 538, BIOL 539 and BIOL 540 can be used towards elective requirements, but cannot be used towards Option Course requirements.
C. CHEE courses at the 300-level and above require a course in differential equations such as BIOM 300 or MATH 225 or and permission of the Department.
D. This Plan is no longer combined with the Biotechnology Diploma Program offered by St. Lawrence College. Students previously admitted to this combined degree/diploma should consult the 2020-2021 Academic Calendar for plan requirements.
E. A maximum of 6.00 units from courses offered by other Faculties and Schools may be counted toward the program and/or Plan requirements. This includes courses in BMED, COMM, GLPH, HSCI, LAW, NURS, and courses in the Faculty of Engineering and Applied Science.

Biotechnology Course Lists
The following lists contain courses offered through other Departments. In accordance with Academic Regulation 2.6 (Access to Classes), students do not have enrolment priority in all of these courses. Access to these courses may only be made available during the September Open Enrolment Period, and then only if space permits.

BTEC_Biology

<table>
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<tr>
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<tr>
<td>BIOL 315</td>
<td>Plants and Human Culture</td>
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<tr>
<td>BIOL 331</td>
<td>Analytical Genomics</td>
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<tr>
<td>BIOL 333</td>
<td>Applied Biology</td>
<td>3.00</td>
</tr>
<tr>
<td>BIOL 334</td>
<td>Comparative Biochemistry</td>
<td>3.00</td>
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<tr>
<td>BIOL 339</td>
<td>Animal Physiology</td>
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<td>BIOL 341</td>
<td>Plant Physiology</td>
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<tr>
<td>BIOL 343</td>
<td>Data Analysis for Biologists</td>
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BTEC_Options

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<tr>
<td>APSC 400</td>
<td>Technology, Engineering &amp; Management (TEAM)</td>
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<td>BCHM 315</td>
<td>Proteins and Enzymes</td>
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<tr>
<td>BCHM 316</td>
<td>Metabolism</td>
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<tr>
<td>BCHM 317</td>
<td>Introductory Biochemistry Laboratory</td>
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<tr>
<td>BCHM 370</td>
<td>Genetics and Genomics</td>
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<tr>
<td>BCHM 410</td>
<td>Protein Structure and Function</td>
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<tr>
<td>BCHM 411</td>
<td>Advanced Molecular Biology</td>
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<tr>
<td>BCHM 432</td>
<td>The Molecular Basis of Cellular Function</td>
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<td>CHEE 229</td>
<td>Cell Based Engineering Princip</td>
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<tr>
<td>CHEE 342</td>
<td>Environmental Biotechnology</td>
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<td>CHEE 380</td>
<td>Biochemical Engineering</td>
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<tr>
<td>CHEE 400</td>
<td>Technology, Engineering &amp; Management (TEAM)</td>
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<tr>
<td>CHEE 440</td>
<td>Pharmaceutical Technology</td>
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<tr>
<td>CHEE 484</td>
<td>Bioremediation</td>
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<tr>
<td>DDHT 459</td>
<td>Principles of Drug Discovery</td>
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<tr>
<td>DDHT 460</td>
<td>Principles of Drug Development</td>
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<td>MICR 221</td>
<td>Fundamental Microbiology</td>
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<td>MICR 270</td>
<td>Infection, Immunity and Inflammation</td>
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<tr>
<td>MICR 271</td>
<td>Introduction to Microbiology</td>
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Queens University

Biotechnology – Specialization (Science) – Bachelor of Science (Honours)  

queensu.ca/academic-calendar
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<tr>
<td>MICR 360</td>
<td>Immunology</td>
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<tr>
<td>MICR 386</td>
<td>Fundamentals of Immunology in Health and Disease</td>
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<td>MICR 435</td>
<td>Advanced Procaryotic Structure and Function</td>
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<td>MICR 451</td>
<td>Viral Pathogenesis</td>
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<td>MICR 461</td>
<td>Advanced Immunology</td>
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<td>PHAR 340</td>
<td>Principles of General Pharmacology I</td>
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<td>Fundamentals of Pharmacology and Therapeutics</td>
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<td>Xenobiotic Disposition and Toxicity</td>
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<td>Principles of General Pharmacology II</td>
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<td>PHAR 480</td>
<td>Drug Discovery and Development</td>
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