DUAL-DEGREE BS/MHS IN BIOMEDICAL SCIENCES (4+1)

Program Contact: Martine Mirrione (martine.mirrione@qu.edu)
203-582-8117

The Department of Biomedical Sciences offers a five-year program leading to a Dual-Degree BS in Biomedical Sciences/MHS in Biomedical Sciences (4+1) with concentrations in Medical Sciences or Microbiology. The curriculum for this dual-degree program provides a solid foundation in the basic and biomedical sciences, which allows students to pursue many different avenues of opportunity depending upon their goals and interests. Students completing this graduate program may qualify for employment in the pharmaceutical and biotechnology industries; the medical diagnostics industry; university-based biomedical research; and city, state and federal health/research laboratories. Additionally, a student with this degree may wish to continue their education in graduate/professional school in: biomedical sciences, medicine, dentistry, veterinary medicine, physician assistant, pathologists’ assistant, cardiovascular perfusion, microbiology and immunology, molecular biology, biotechnology, neurobiology, pharmacology, toxicology, cancer biology, plus many other areas.

To remain in good standing within the program, students must maintain a GPA of 3.00 overall, as well as in math and science for the remainder of their undergraduate careers. Students also must maintain an overall GPA of 3.00 for the graduate portion and successfully pass the comprehensive examination in their final semester of their graduate year.

Dual-Degree BS/MHS in Biomedical Sciences (Concentrations in Medical Sciences or Microbiology) Curriculum

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tr>
<td><strong>First Year</strong></td>
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<td>BIO 150</td>
<td>General Biology for Majors</td>
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</tr>
<tr>
<td>CHE 110 &amp; 110L</td>
<td>General Chemistry I and General Chemistry I Lab</td>
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</tr>
<tr>
<td>EN 101</td>
<td>Introduction to Academic Reading and Writing</td>
<td>3</td>
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<tr>
<td>FYS 101</td>
<td>First-Year Seminar</td>
<td>3</td>
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<tr>
<td>MA 140 or MA 141</td>
<td>Pre-Calculus 1 or Calculus of a Single Variable</td>
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<tr>
<td>BIO 151</td>
<td>Molecular and Cell Biology and Genetics</td>
<td>4</td>
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<tr>
<td>CHE 111 &amp; 111L</td>
<td>General Chemistry II and General Chemistry II Lab</td>
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<tr>
<td>EN 102</td>
<td>Academic Writing and Research</td>
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<td>BMS 275</td>
<td>Introduction to Biomedical Research</td>
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<td>UC Disciplinary Inquiry</td>
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<td>BIO 211 &amp; 211L</td>
<td>Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I</td>
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<tr>
<td><strong>Fourth Year</strong></td>
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<tr>
<td>BMS 522</td>
<td>Immunology</td>
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<td>&amp; 522L</td>
<td>and Immunology Lab</td>
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<td>UC Personal Inquiry</td>
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<td>UC Personal Inquiry</td>
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<td><strong>Spring Semester</strong></td>
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<tr>
<td>BMS 518</td>
<td>Pathophysiology</td>
<td>3</td>
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<tr>
<td>Graduate BMS Specialization/Elective(s)</td>
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<td>3</td>
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<tr>
<td>SHS 420</td>
<td>Integrative Capstone</td>
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<td>UC Personal Inquiry</td>
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<tr>
<td>Open Elective(s)</td>
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<td>2</td>
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<td><strong>Credits</strong></td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td>120</td>
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Post-Baccalaureate Phase (Master's)

Along with the 10 graduate-level credits taken as an undergrad, students earn the Master of Health Science in Biomedical Sciences after
completing 28 additional credits during the graduate year (non-thesis is shown, but students may also follow thesis track).

<table>
<thead>
<tr>
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<th>Credits</th>
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<tr>
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<td><strong>Fall Semester</strong></td>
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<tr>
<td>BMS 502</td>
<td>Research Methods</td>
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<tr>
<td>BMS 532</td>
<td>Histology and Lab</td>
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<tr>
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<td><strong>Credits</strong></td>
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<td><strong>Spring Semester</strong></td>
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<td>BMS 670</td>
<td>Comp Exam/Biomedical Sciences</td>
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<tr>
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<td><strong>Credits</strong></td>
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<tr>
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<td><strong>Total Credits</strong></td>
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1 Minimum mathematics requirement: MA 140. For those interested in graduate or professional schools, MA 141 is recommended.

2 The comprehensive exam must be completed by April 15 of the fifth year.

**Comprehensive Examination**

The comprehensive examination in biomedical sciences (2 credits) is a requirement for the non-thesis option in the Biomedical Sciences program. The purpose of the exam is two-fold. First, the student must demonstrate broad and specific knowledge expected of someone holding a master's degree. Second, the student must be able to integrate knowledge obtained from individual courses into unified concepts which link the student's own specialization to other fields of study. The student is given two opportunities to demonstrate competency. A written essay exam is administered by a designated faculty member. Students should schedule an appointment with the program director before registering for the comprehensive exam.

**Areas of Specialization**

**Medical Sciences**

<table>
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<tr>
<th>Code</th>
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<td>BMS 518</td>
<td>Pathophysiology</td>
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<td>BMS 522</td>
<td>Immunology</td>
<td>4</td>
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<tr>
<td>&amp; 522L</td>
<td>and Immunology Lab</td>
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<tr>
<td>BMS 532</td>
<td>Histology and Lab</td>
<td>4</td>
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</tr>
<tr>
<td>BIO 515</td>
<td>Advanced Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BIO 568</td>
<td>Molecular and Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIO 571</td>
<td>Molecular Genetics</td>
<td>4</td>
</tr>
<tr>
<td>BMS 508</td>
<td>Advanced Biology of Aging</td>
<td>3</td>
</tr>
<tr>
<td>BMS 519</td>
<td>Computational Biomedicine</td>
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<tr>
<td>BMS 520</td>
<td>Neuropharmacology</td>
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<tr>
<td>BMS 521</td>
<td>Advances in Hematology</td>
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<tr>
<td>BMS 527</td>
<td>Pharmacology</td>
<td>3</td>
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<tr>
<td>BMS 535</td>
<td>Histochemistry and Lab</td>
<td>3</td>
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<tr>
<td>BMS 536</td>
<td>Endocrinology</td>
<td>3</td>
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<tr>
<td>BMS 552</td>
<td>Toxicology</td>
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**Microbiology**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Core Courses</strong></td>
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</tr>
<tr>
<td>BMS 502</td>
<td>Research Methods</td>
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<tr>
<td>BMS 522</td>
<td>Immunology</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 522L</td>
<td>and Immunology Lab</td>
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<tr>
<td>BMS 570</td>
<td>Virology</td>
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<tr>
<td>BMS 572</td>
<td>Pathogenic Microbiology</td>
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<tr>
<td><strong>Specialization Electives</strong></td>
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<td></td>
</tr>
<tr>
<td>BIO 568</td>
<td>Molecular and Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIO 571</td>
<td>Molecular Genetics</td>
<td>4</td>
</tr>
<tr>
<td>BMS 525</td>
<td>Vaccines and Vaccine Preventable Diseases</td>
<td>3</td>
</tr>
<tr>
<td>BMS 526</td>
<td>Epidemiology</td>
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<tr>
<td>BMS 528</td>
<td>Advanced Clinical Parasitology</td>
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</tr>
<tr>
<td>BMS 569</td>
<td>Antimicrobial Therapy</td>
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<tr>
<td>BMS 573</td>
<td>Mycology</td>
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<tr>
<td>BMS 575</td>
<td>Food Microbiology</td>
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<tr>
<td>BMS 576</td>
<td>Drug Discovery and Development</td>
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<tr>
<td>BMS 579</td>
<td>Molecular Pathology</td>
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<tr>
<td>BMS 584</td>
<td>Emerging and Re-emerging Infectious Diseases</td>
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<td>BMS 585</td>
<td>Outbreak Control</td>
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<td>BMS 595</td>
<td>Transplantation Immunology</td>
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**Graduate Science Electives**

<table>
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<tr>
<td>BIO 500</td>
<td>Special Topics in Molecular and Cell Biology</td>
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<td>BIO 505</td>
<td>Writing and Science</td>
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<tr>
<td>BIO 515</td>
<td>Advanced Biochemistry</td>
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<tr>
<td>BIO 562</td>
<td>Bioinformatics</td>
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<td>BIO 568</td>
<td>Molecular and Cell Biology</td>
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<td>BIO 571</td>
<td>Molecular Genetics</td>
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<td>BIO 589</td>
<td>Molecular and Cell Neurobiology</td>
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<tr>
<td>BIO 605</td>
<td>DNA Methods Laboratory</td>
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<tr>
<td>BIO 606</td>
<td>Protein Methods Laboratory</td>
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Mission Statement

The mission of Quinnipiac University’s Dual-Degree BS/MHS in Biomedical Sciences (4+1) program (with concentrations in Medical Sciences or Microbiology) is to provide students with the cutting-edge skills they need to manage the more complex operations carried out today in hospitals and research facilities, as well as allowing students to develop their critical thinking skills and knowledge of the biomedical sciences, sought after by PhD programs and medical schools. The program provides the student with a comprehensive knowledge to meet the education and technical needs of the biomedical profession in pharmaceutical, biotechnology, diagnostics and medical research. Students are guided in the principles and methods of scientific research, and they gain knowledge of the latest advances in biomedical, biotechnological and laboratory sciences—all directly applicable to real-world work environments.

Student Learning Outcomes

Upon completion of the Dual-Degree BS/MHS in Biomedical Sciences (4+1) program, students will demonstrate the following competencies:

1. **Foundational Knowledge**: Demonstrate advanced knowledge of the major disciplines in the Biomedical Sciences (Biology, Chemistry, Physics, Physiology, Microbiology, Immunology, Pathophysiology).
2. **Disease Mechanisms**: Identity factors that influence human health and disease.
3. **Translational Science**: Critically analyze how new research discoveries can be translated into effective patient treatments/interventions.
4. **Professional Skills**: Master the essential technical skills critical for success in a laboratory environment.
5. **Effective Scientist**: Engage in scientific research and effectively communicate the dissemination of results to various audiences.
6. **Responsible Citizen**: Evaluate the social and ethical impact of scientific discoveries on medical practice.

Admission to the Program

Students interested in applying to the Dual-Degree BS/MHS in Biomedical Sciences (4+1) with concentrations in Medical Sciences or Microbiology must meet with the program contact. It is encouraged that interested students work with the graduate BMS program director, in addition to their academic adviser, to plan for taking graduate courses during junior or senior year. In the fall of the senior year, the student may apply for admission into the program. Admission into the program is dependent on the applicant’s potential to pursue a university program and on past academic performance. At the time of application submission, students must have a GPA of 3.00 overall, as well as in math and science. To remain in good standing within the program and be eligible to enter the graduate curriculum, the student must maintain a GPA of 3.00 overall, as well as in math and science for the remainder of their undergraduate careers.

Students in other science programs at Quinnipiac such as Health Sciences, Behavioral Neuroscience, Biology or Chemistry who successfully complete a rigorous undergraduate science curriculum may be eligible for admittance into the graduate portion of the program and should contact the program director.
Pre-Medical Studies Program

Students majoring in Health Science Studies, Biology, Biomedical Sciences or the pre-health track of Behavioral Neuroscience may fully participate in the pre-medical studies program. The curriculum in this degree program can fulfill the science prerequisites for most professional schools. Students should refer to Pre-Medical Studies (http://catalog.qu.edu/academics/premedical-studies/) for more information about the pre-medical studies program and contact the Health Professions Advisory Committee for further academic advising.