

# BIOMEDICAL SCIENCES PROGRAM

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Medical laboratory research and diagnostic testing are among today's most exciting professions. The last decade has brought many exciting breakthroughs in the diagnosis and treatment of disease as well as new challenges such as AIDS, Lyme disease and the resurgence of tuberculosis. These new developments and challenges require laboratory professionals to stay on the cutting edge of their field. New techniques have to be mastered, new theories and concepts understood, and new means of managing the more complex operations of laboratories developed. The Biomedical Sciences program at Quinnipiac is specially designed to meet the educational needs of students to complete their education toward a degree in medicine or PhD programs or employment in the research/development industry and diagnostic companies. The program provides the training that is necessary to stay current with today's rapidly changing technology and to assume positions of greater responsibility. A laptop is required for all students enrolled in the MHS in Biomedical Sciences program.

## MHS in Biomedical Sciences Program of Study

Students may choose either a thesis or a non-thesis option in the Biomedical Sciences program. Both options require students to take four courses or more in their specialization while allowing students to choose a number of electives to meet their individual needs.

### Thesis Option Requirements (based on availability of faculty)

The curriculum includes a minimum of 35 credits including 8 credits of thesis (BMS 650, BMS 651). A total of 15–16 credits of core classes in an area of specialization is required along with three classes (9–12 credits) of electives within the specific area of specialization. Open elective courses could be chosen from any area of specialization.

Code	Title	Credits
BMS 650	Thesis I	4
BMS 651	Thesis II	4
Core courses in area of specialization <sup>1</sup>		15-16
Three areas of specialization electives <sup>1</sup>		9-12
Open electives		0-3
<b>Total Credits</b>		<b>35-38</b>

<sup>1</sup> Since most courses are either 3 or 4 credits, the total credits from area of specialization and total number of elective courses are based on the number of credits for individual courses.

### Non-Thesis Option Requirements

The curriculum includes a minimum of 38 credits including 2 credits of comprehensive examination (BMS 670). A total of 15–16 credits of core classes in an area of specialization is required along with three elective classes (9–12 credits) within the specific area of specialization. Open elective courses could be chosen from any area of specialization.

Code	Title	Credits
Comprehensive Exam		2
Core courses in area of specialization <sup>1</sup>		15-16
Three areas of specialization electives <sup>1</sup>		9-12
Open electives <sup>1</sup>		9-12
<b>Total Credits</b>		<b>38-41</b>

<sup>1</sup> Since most courses are either 3 or 4 credits, the total credits from area of specialization and total number of elective courses are based on the number of credits for individual courses.

### Comprehensive Examination

The comprehensive examination in medical laboratory 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

#### Biomedical Sciences

Code	Title	Credits
<b>Core Courses</b>		
BMS 502	Research Methods	4
BMS 518	Pathophysiology	3
BMS 522 & 522L	Immunology and Immunology Lab	4
BMS 532	Histology and Lab	4
<b>Specialization Electives</b>		
BIO 515	Advanced Biochemistry	4
BIO 568	Molecular and Cell Biology	4
BIO 571	Molecular Genetics	4
BMS 508	Advanced Biology of Aging	3
BMS 519	Computational Biomedicine	3
BMS 520	Neuropharmacology	3
BMS 521	Advances in Hematology	3
BMS 527	Pharmacology	3
BMS 535	Histochemistry and Lab	3
BMS 536	Endocrinology	3
BMS 552	Toxicology	3
BMS 561	Immunohematology	3
BMS 562	Blood Coagulation and Hemostasis	3
BMS 563	Anemias	3
BMS 564	Fundamentals of Oncology	4
BMS 565	Leukemia	3
BMS 569	Antimicrobial Therapy	3
BMS 571	Human Anatomy & Dissection	4
BMS 576	Drug Discovery and Development	3
BMS 579	Molecular Pathology	3
BMS 583	Forensic Pathology	3

BMS 598	Synaptic Organization of the Brain	3
BMS 599	Biomarkers	3
PA 515	Human Physiology	4

### Microbiology

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

### Graduate Science Electives

Code	Title	Credits
<b>Open Electives</b>		
BIO 500	Special Topics in Molecular and Cell Biology	1
BIO 505	Writing and Science	3
BIO 515	Advanced Biochemistry	4
BIO 562	Bioinformatics	3
BIO 568	Molecular and Cell Biology	4
BIO 571	Molecular Genetics	4
BIO 589	Molecular and Cell Neurobiology	3
BIO 605	DNA Methods Laboratory	4
BIO 606	Protein Methods Laboratory	4
BMS 503	Professional Development in Biomedical Sciences	1
BMS 508	Advanced Biology of Aging	3
BMS 510	Biostatistics	3
BMS 511	Writing for Scientists	3
BMS 517	Human Embryology	3
BMS 518	Pathophysiology	3
BMS 519	Computational Biomedicine	3
BMS 520	Neuropharmacology	3
BMS 521	Advances in Hematology	3
BMS 525	Vaccines and Vaccine Preventable Diseases	3

BMS 526	Epidemiology	3
BMS 527	Pharmacology	3
BMS 528	Advanced Clinical Parasitology	4
BMS 532	Histology and Lab	4
BMS 535	Histochemistry and Lab	3
BMS 536	Endocrinology	3
BMS 552	Toxicology	3
BMS 556	Seminar in Health Care Disparities	1
BMS 561	Immunohematology	3
BMS 562	Blood Coagulation and Hemostasis	3
BMS 563	Anemias	3
BMS 564	Fundamentals of Oncology	4
BMS 565	Leukemia	3
BMS 569	Antimicrobial Therapy	3
BMS 570	Virology	4
BMS 571	Human Anatomy & Dissection	4
BMS 572	Pathogenic Microbiology	4
BMS 573	Mycology	3
BMS 575	Food Microbiology	4
BMS 576	Drug Discovery and Development	3
BMS 577	Critical Analysis and Reasoning In the Biomedical Sciences	2
BMS 578	Cellular Basis of Neurobiological Disorders	3
BMS 579	Molecular Pathology	3
BMS 583	Forensic Pathology	3
BMS 584	Emerging and Re-emerging Infectious Diseases	3
BMS 585	Outbreak Control	3
BMS 591	The New Genetics and Human Future	3
BMS 595	Transplantation Immunology	3
BMS 597	Biomedical Sciences Internship	4
BMS 598	Synaptic Organization of the Brain	3
BMS 599	Biomarkers	3
BMS 622	MED Cross-Listed Selective	3
BMS 681	Research Methods in Biomedical Sciences I	1-4
BMS 688	Independent Study	2
BMS 689	Independent Study	2
PA 515	Human Physiology	4
PA 516	Clinical Pathology	4
PA 535	Disease Mechanisms	4

## Student Learning Outcomes

Upon completion of the program, students will demonstrate the following competencies:

- Scientific Knowledge:** Demonstrate an advanced understanding of translational science in biomedical and microbiological topics.
- Translational Science:** Critically analyze scientific literature and develop critical thinking skills necessary to implement evidence-based translational research.

3. **Effective Scientist:** Engage in the scientific process including research ethics, experimental design and data collection and analysis.
4. **Responsible Citizen:** Evaluate the social and ethical impact of scientific discoveries on medical practice.

## Mission Statement

The mission of Quinnipiac University's Master of Health Science in Biomedical Sciences program 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 two specialties included in the program (biomedical sciences and microbiology) and the integration of courses from these individual specialties provide 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.

To be considered for admission into the Biomedical Sciences program, applicants must meet the following requirements:

- Bachelor's degree in the biological, medical or health sciences from a regionally accredited institution in the U.S. or Canada.
- Scores for the tests of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) if the applicant is from a non-English speaking country.
- A minimum undergraduate GPA of 2.75; however the most successful applicants have a GPA of 3.00 or higher.
- All undergraduate transcripts and a detailed autobiography indicating why the student would like admission into the program, as well as personal, professional and educational achievements.
- Two letters of reference detailing the applicant's academic and interpersonal strengths.

Applications may be obtained from the Office of Graduate Admissions. Applicants should refer to the graduate admission requirements (<http://catalog.qu.edu/graduate-studies/#admissionstext>) found in this catalog. Applications to this program are accepted throughout the year. Incoming students can start the program in either the fall or spring semester.