

BACHELOR OF SCIENCE IN MEDICAL MICROBIOLOGY AND IMMUNOLOGY

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Rapid and expanding advances in the field of medical microbiology and immunology have created a need for employees with expertise in a variety of areas. Our graduates are prepared for exciting careers in the expanding medical, clinical, pharmaceutical, biotechnological, molecular and health industries. This program also prepares the student for advanced study in specialized graduate science, health and medical programs.

The program offers students a range of classroom, laboratory and independent research experiences. All courses consist of lecture and hands-on laboratories where students perform the most current research techniques. In addition to courses in the sciences, the University Curriculum (<http://catalog.qu.edu/academics/university-curriculum/>) course offerings prepare students with a broad-based conceptual understanding of science and its role in society.

Included in this program is a two-semester required undergraduate seminar/research experience performed with faculty in research laboratories. This experience allows the student to develop the expertise and experience to be successful in beginning a career or in graduate study. All of our students give formal presentations of their independent research projects. Many have presented the results of research experiences at professional scientific meetings.

Successful third- and fourth-year students may be able to obtain internships or part-time work experiences during the school year and/or summer in government labs and major pharmaceutical or biotechnology companies located in the region. To remain in good standing within the program, the student must maintain a math and science GPA of 2.25.

BS in Medical Microbiology and Immunology Curriculum

Course	Title	Credits
First Year		
Fall Semester		
BIO 150	General Biology for Majors	4
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
EN 101	Introduction to Academic Reading and Writing	3
MA 140 or MA 141	Pre-Calculus ¹ or Calculus of a Single Variable	3
FYS 101	First-Year Seminar	3
Credits		17
Spring Semester		
BIO 151	Molecular and Cell Biology and Genetics	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
EN 102	Academic Writing and Research	3
UC Disciplinary Inquiry		3

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Credits		17
Second Year		
Fall Semester		
BMS 370 & 370L	General Microbiology and General Microbiology Lab	4
CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
PHY 110 & 110L	General Physics I and General Physics I Lab	4
UC Disciplinary Inquiry		3
Credits		15
Spring Semester		
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
PHY 111 & 111L	General Physics II and General Physics II Lab	4
BMS 372 & 372L	Pathogenic Microbiology and Pathogenic Microbiology Lab	4
UC Personal Inquiry		3
Credits		15
Third Year		
Fall Semester		
BMS 375 & 375L	Immunology and Immunology Lab	4
Microbiology Elective		3-4
Science Elective		4
UC Personal Inquiry ²		3
Credits		14-15
Spring Semester		
CHE 315 & 315L	Biochemistry I and Biochemistry I Lab	4
Microbiology Elective ³		4
Science Elective		4
UC Personal Inquiry		3
Credits		15
Fourth Year		
Fall Semester		
BMS 478	Microbiology Seminar	1
Immunology Elective		3-4
Science Elective		4
Science Elective		4
UC Personal Inquiry		3
Credits		15-16
Spring Semester		
BMS 479	Microbiology Research	2
Microbiology Elective		4
SHS 420	Integrative Capstone	3
Microbiology Elective		4
UC Personal Inquiry		3
Credits		16
Total Credits		124-126

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Minimum mathematics requirement: MA 140. For those interested in graduate or professional schools, MA 141 is recommended.

2

MA 275 strongly recommended.

3

BIO 471 and BMS 470 strongly recommended.

Microbiology and Science Electives

Code	Title	Credits
BIO 346 & 346L	Cell Physiology and Cell Physiology Lab	4
BIO 471 & 471L	Molecular Genetics and Molecular Genetics Lab	4
BMS 278	Research and Technology	3
BMS 299	Biomedical Sciences Journal Club	1
BMS 319	Public Health: Epidemiology of Infectious Diseases	3
BMS 373 & 373L	Mycology and Mycology Lab	4
BMS 470	Virology	4
BMS 472	Biotechnology	4
BMS 473	Infections of Leisure	3
BMS 474	Power of Plagues	3
BMS 475	Special Topics in Microbiology	1-4
BMS 477	Critical Analysis and Reasoning In the Biomedical Sciences	2
BMS 481	Research Techniques in Biomedical Sciences	1-4
BMS 482	Independent Study in Microbiology	1-4
BMS 483	Independent Study in Microbiology	1-4
BMS 526	Epidemiology	3
BMS 584	Emerging and Re-emerging Infectious Diseases	3
BMS 585	Outbreak Control	3

Immunology and Science Electives

Code	Title	Credits
BMS 319	Public Health: Epidemiology of Infectious Diseases	3
BMS 378	Vaccines and Vaccine-Preventable Diseases	3
BMS 473	Infections of Leisure	3
BMS 474	Power of Plagues	3
BMS 482	Independent Study in Microbiology	1-4
BMS 483	Independent Study in Microbiology	1-4
BMS 525	Vaccines and Vaccine Preventable Diseases	3
BMS 561	Immunohematology	3
BMS 595	Transplantation Immunology	3

Recommended Science Electives

Code	Title	Credits
BIO 211 & 211L	Human Anatomy and Physiology I and Human Anatomy and Physiology Lab I	4
BIO 212 & 212L	Human Anatomy and Physiology II and Human Anatomy and Physiology II Lab	4
BIO 282 & 282L	Genetics and Genetics Lab	4
BIO 317 & 317L	Developmental Biology and Developmental Biology Lab	4
BMS 332	Histology and Lab	4

Additional electives may be selected with the approval of the department chair.

Student Learning Outcomes

Upon completion of the medical microbiology and immunology program, students will demonstrate the following competencies:

- Core Disciplines:** Demonstrate advanced knowledge of the foundational principles in the disciplines of biology, chemistry and physics.
- Advanced Knowledge:** Demonstrate advanced knowledge of the fundamental concepts of microbiology and immunology.
- Organisms and Host:** Understand the symbiotic relationships that can exist between microorganisms and humans (mutualistic, commensal and pathogenic).
- Professional Skills:** Master the essential technical and analytical skills of the microbiologist/immunologist.
- Effective Scientist:** Engage in scientific research and effectively communicate the dissemination of results to various audiences.
- Responsible Citizen:** Evaluate the social and ethical impact of scientific discoveries on medical practice.

Mission Statement

The mission of the Medical Microbiology and Immunology degree program is to provide students with a solid basic science foundation in preparation for studying the upper-level sciences related to immunology and microbiology. This is meant to provide many opportunities to students who are interested in pursuing graduate programs (MS/PhD) in the micro-biological sciences (e.g., bacteriology, virology, public health, etc.), as well as sciences related to immunology (e.g., vaccines, epidemiology, cancer biology, etc.).

Additionally, students may pursue one of the medical-related professions (e.g., physician, physician assistant, dentist, veterinarian, pharmacist, chiropractor, etc.). Students who choose not to go on to graduate or professional school are able to apply for research and development positions in pharmaceutical and biotechnology companies.

Students learn about molecular biology with hands-on student-directed laboratory projects where thinking, planning and problem-solving skills are developed. Independent research projects under the guidance of faculty allow development of these skills with "real-world" experiences.

Student skills are evaluated continuously with written and oral presentations, encouraging the refinement of communication skills

critical to a successful career. Products of student research activity are presented in seminars and at regional or national scientific meetings.

Admission

Admission into the Medical Microbiology and Immunology program is dependent on the applicant's potential to pursue a university program and on past academic performance. The high school student applying for admission into the Medical Microbiology and Immunology program should have a strong background in the biological sciences. To remain in good standing within the program, the student must maintain a math and science GPA of 2.25.

Transfer Students from within Quinnipiac University

Students currently attending Quinnipiac University in another program may be accepted into the Medical Microbiology and Immunology program based upon a review of qualification by the program director. Students may apply upon completion of at least one semester at Quinnipiac University. Students transferring in as a junior (i.e., 57 credits or more) must have completed both the general biology requirements, specifically, 8 credits of BIO 101 & BIO 102 *or* BIO 150 & BIO 151, and the general chemistry requirements, specifically, 8 credits of Quinnipiac's CHE 110 & CHE 111 prior to entry into the upper-class component of the program. Student also must meet the performance standards of the program (minimum math and science GPA of 2.25).

Transfer Students from Other Colleges and Universities

Transfer students from other colleges and universities may be accepted into the Medical Microbiology and Immunology program. These students must meet the program's performance standards and course requirements. For all transfer students, a minimum GPA of 2.67 is required. Students transferring in as a junior (i.e., 57 credits or more) must have completed both the general biology requirements, specifically, the equivalent of 8 credits of Quinnipiac's BIO 101 & BIO 102 *or* BIO 150 & BIO 151, and the general chemistry requirements, specifically, the equivalent of 8 credits of Quinnipiac's CHE 110 & CHE 111 prior to entry into the upper-class component of the program. Transfer students wishing to enter this program will be given appropriate transfer credit for previous college work.

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.

Seamless Transfer Agreement with Gateway Community College (GCC), Housatonic Community College (HCC) and Norwalk Community College (NCC)

Under this Transfer Agreement, GCC, HCC and NCC graduates will be guaranteed admission into a bachelor's degree program with third year (junior) status at Quinnipiac University on the condition that they:

- Graduate with an associate in arts, an associate in science in business, College of Technology engineering science, nursing or an allied health degree with a minimum cumulative GPA of 3.00 (this may be higher in specific programs).
- Satisfy all other Quinnipiac University transfer admission requirements and requirements for intended major.

Quinnipiac University agrees to accept the general education embedded in these associate degree programs in accordance with Quinnipiac preferred choices for general education as meeting all the requirements of its undergraduate general education except for the Integrative Capstone Experience and where courses are encumbered by the major (e.g., General Chemistry for the Disciplinary Inquiry Natural Science requirement for a Biochemistry major).

Suggested Transfer Curriculum for BS in Medical Microbiology and Immunology

A minimum of 60 credits is required for transfer into the BS in Medical Microbiology and Immunology program. Below is a sample plan of study for the first two years.

Course	Title	Credits
First Year		
Fall Semester		
English		3
General Biology with Lab		4
General Chemistry with Lab		4
Math - Precalculus		3
Credits		14
Spring Semester		
English II		3
General Biology II with Lab		4
General Chemistry II with Lab		4
Math - Calculus		3
Elective		3
Credits		17
Second Year		
Fall Semester		
Anatomy & Physiology I with Lab		4
General Physics with Lab		4
Elective		3
Elective		3
Credits		14
Spring Semester		
Anatomy & Physiology II with Lab		4
General Physics II with Lab		4
Microbiology with Lab		4

Elective	3
Credits	15
Total Credits	60