DOUBLE MAJOR: B.S. IN MICROBIOLOGY AND IMMUNOLOGY AND PUBLIC HEALTH

Overview

To be admitted to this program students must have prior college credit or be a Foote Fellow

The University of Miami is one of only four institutions in the United States that offers a four-year combined undergraduate program in Microbiology and Immunology. You will study, a) microorganisms (which can be good and bad for your health, found in food, and in our environments) and b) how your body's immune defense system defeats and controls harmful microorganisms. Our major provides you with courses of general interest as well as a solid preparation for future scientists or medical professionals. To apply this knowledge to health policy, we partnered with the School of Nursing and Health Studies Public Health program to offer a double major track opportunity for our students.

Microorganisms: You will learn about bacteria that cause serious infections including the plague, meningitis, and tuberculosis; not so serious infections like staphylococci causing a boil; and those that inhabit your bodies in symbiotic relationships (your microbiome). Regarding viruses, you will learn about emerging viruses like SARS-CoV-2 (causative agent of COVID-19) and Zika, endemic and pandemic viruses like the flu, and those causing chronic infections like HIV/AIDS. Parasites such as those cause malaria and fungi round out the breadth and depth of our offered coursework.

Immune system: You will study its mechanisms to avoid microbial infections in the first place; how it will cause the body's resistance to them either by natural infection or vaccination; how pathogens like HIV and tumors are able to overcome the multiple barriers of the immune system to cause AIDS and cancer, and their up-to-date virological and, respectively, immunological therapies. Finally, you will understand how a mistuned immune system can cause allergies such as asthma or autoimmune diseases such as type I diabetes.

Our program provides you with:

- a broad knowledge base
- laboratory experiences and the opportunity to conduct research in one of our laboratories at the Miller School of Medicine
- the ability to attend a broad spectrum of seminars offered through our home department at the Miller School of Medicine
- opportunities to communicate and write in a scientific manner
- exposure to critical thinking within our field

Students that have finished our program have gone on to careers at other prestigious institutions which include research, medicine, dentistry, physician assistant, pharmacy, optometry, epidemiology, law and many more.

The University of Miami School of Nursing and Health Studies Undergraduate Program in Public Health aims to develop competencies in public health among undergraduate students, equip undergraduate students for entry-level public health positions, and prepare undergraduate students to pursue graduate studies in public health and related fields. Students will be exposed to major public health issues locally, nationally and globally. The curriculum is designed to introduce students to the core areas of public health—including epidemiology, environmental health, social and behavioral health, global health and health policy—and to prepare students to work with communities in ways that are evidence-based and culturally competent.

This double major is designed so that each student can fulfill both the STEM and People and Society areas of knowledge (through the MIC major and additional major in Public Health, respectively).

Curriculum Requirements

Code	Title	Credit Hours
MICROBIOLOGY AND IMMUNOLOGY MAJOR REQUIREMENTS *		
Three Tiered Approach		
Required Coursework		**15**
Tier 1:		
MIC 301	Introduction to Microbes and the Immune System	
MIC 304	Introduction to Microbes and the Immune System (Lab)	
Tier 2:		
MIC 321	Immunobiology	
MIC 323	Microbial Biology and Pathogenesis	
Tier 3:		
MIC 460	Advanced Topics in Microbiology and Immunology (A)	
or MIC 470	Advanced Topics in Microbiology and Immunology (B)	
Elective Coursework		**9**
MIC 201	Modern Plagues and Society	

MIC 322	Medical Parasitology	
MIC 444	Lab Techniques and Experimental Design	
MIC 460	Advanced Topics in Microbiology and Immunology (A)	
MIC 470	Advanced Topics in Microbiology and Immunology (B)	
Research in MIC for Credit		
(only 6 credit hours may be applied to count toward the 9 MIC Elective Credits above, any credits over 6 count as elective credits toward the 120 credits required for graduation)		
MIC 451	Special Projects in Immunobiology (2-6cr.) [1]	
MIC 452	Special Projects in Microbiology (2-6cr.) [1]	
MIC 453	Special Projects in Parasitology (3cr. cannot be repeated) [1]	
PUBLIC HEALTH ADDITIONAL MAJOR REQUIREMENTS		
BPH 206	Introduction to Public Health	3
BPH 208	Introductory Epidemiology (Double Counts for MIC major elective)	3
BPH 202	Introductory Statistics in Health Care (also satisfies statistics requirement)	3
BPH 321	Health Promotion and Disease Prevention [3]	3
BPH 310	Global Health [3]	3
BPH 322	Introduction to Health Policy	3
BPH 309	Health and Environment [3]	3
BPH 465	Public Health Statistics and Data Management (Can count for B.S. statistics requirement)	3
BPH 305	Issues in Health Disparities [3]	3
BPH 490	Field Practicum in Community Health [3]	4
COURSES TAKEN IN FULFILLMENT OF BOTH MAJORS		
MIC 301	Introduction to Microbes and the Immune System (Together with MIC 304, waives BPH 352 requirement for BPH majors, Must be taken before or after MIC 301 for MIC majors.)	
MIC 304	Introduction to Microbes and the Immune System (Lab) (Together with MIC 301, waives BPH 352 requirement for BPH majors, Must be taken before or after MIC 301 for MIC majors.) [3]	
BPH 208	Introductory Epidemiology (counts toward both BPH and MIC majors)	
MIC 321	Immunobiology (either course counts as an elective for the BPH major)	
or MIC 460	Advanced Topics in Microbiology and Immunology (A)	
REQUIRED NATURAL SCIENCE COURSES		
Chemistry Courses: [**]		
CHM 121 & CHM 113	Principles of Chemistry and Chemistry Laboratory I	5
CHM 221 & CHM 205	Introduction to Structure and Dynamics and Chemical Dynamics Laboratory	5
CHM 222 & CHM 206	Organic Reactions and Synthesis and Organic Reactions and Synthesis Laboratory	6
or CHM 207	Chemical Dynamics and Organic Synthesis Laboratory	
Other Required Natural Science Courses:		
BIL 150 & BIL 151	General Biology and General Biology Laboratory	5
or BIL 153	Introductory Biology/Chemistry Laboratory I	
BIL 160 & BIL 161	Evolution and Biodiversity and Evolution and Biodiversity Laboratory	5
or BIL 163	Introductory Biology/Chemistry Laboratory II	
BMB 401	Biochemistry for the Biomedical Sciences	4
Select one of the following Physics Options:		**10**
Option 1:		

PHY 101 & PHY 106	College Physics I and Physics Laboratory 1	
PHY 102 & PHY 108	College Physics II and Physics Laboratory 2	
Option 2:		
PHY 201 & PHY 106	University Physics I for the Sciences and Physics Laboratory 1	
PHY 202 & PHY 108	University Physics II for the Sciences and Physics Laboratory 2	
Option 3:		
PHY 221	University Physics I	
PHY 222	University Physics II	
PHY 223	University Physics III	
PHY 224	University Physics II Lab	
or PHY 225	University Physics III Lab	
Option 4:		
PHY 211 & PHY 106	University Physics I for PRISM and Physics Laboratory 1	
PHY 212 & PHY 108	University Physics II for PRISM and Physics Laboratory 2	
Select one of the following Calculus Options: [2]		**8-12**
Option 1:		
MTH O99 & MTH 101 & MTH 107 & MTH 108 & MTH 140 & MTH 141 & MTH 162	Intermediate Algebra and Algebra for College Students and Precalculus Mathematics I and Precalculus Mathematics II and Calculus Concepts with Foundations A and Calculus Concepts with Foundations B and Calculus II	
Option 2:		
MTH 140 & MTH 141 & MTH 162	Calculus Concepts with Foundations A and Calculus Concepts with Foundations B and Calculus II	
Option 3:		
MTH 161 & MTH 162	Calculus I and Calculus II	
Option 4:		
MTH 171 & MTH 172	Calculus I and Calculus II	
GENERAL EDUCATION REQUIREMENTS		
Written Communication Skills (6 credits):		
WRS 105	First-Year Writing I	3
WRS 106	First-Year Writing II	3
or WRS 107	First-Year Writing II: STEM	
or ENG 106	Writing About Literature and Culture	
Quantitative Skills (3 credits) (fulfilled through the Calculus Option)		
Areas of Knowledge:		
Arts and Humanities Cognate		9
People & Society Cognate (9 credits) (fulfilled through the Public Health additional major)		
STEM Cognate (9 credits) (fulfilled through the Microbiology & Immunology major)		
ADDITIONAL REQUIRED COURSES* **		
Language Requirement		3
Total Credit Hours		**121**

[1] MIC 451, MIC 452, MIC 453 require that you have already completed MIC 304 and earned at least a B and have a 3.0 cumulative GPA with permission of Dr. Schesser or Roger, Fall and Spring Semesters

[2] Depends on Math placement from SAT/ACT or ALEKS score.

[3] Fulfills the College of Arts & Sciences Advanced Writing and Communication Skills requirement. MIC 280 (zero credit) may also be used to satisfy one of the 4 required. Please contact Roger Williams, M.S. Ed. for permission.

* Transfer students seeking a Microbiology and Immunology major must earn at least 15 credit hours taken in residence in the UM Department of Microbiology and Immunology beyond MIC 301 in the courses listed above for majors.

** All MIC majors are required to have a minor (science or non-science). Students will receive a CHM minor provided that they earn a C- or better in every course of the minor while in residence at UM. A total of 19 credits are required for the CHM minor. All students should declare their CHM minor when they begin our program in ASHE 200 by filling out an academic change form. On this form, you can declare also additional majors/minors as well as your Arts and Humanities cognate.

*** Students pursuing postgraduate plans in the health sciences may need to take additional courses for entrance.

Sample Plan of Study

This is a 4 year sample plan of study that assumes courses are taken during the fall and spring.

This is a guide and is not meant to take the place of the advice of your major advisor, you should consult with them before making any changes.

Freshman Year		
Fall		**Credit Hours**
MIC 304	Introduction to Microbes and the Immune System (Lab)	3
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
WRS 105	First-Year Writing I	3
	Credit Hours	**16**
Spring		
MIC 301	Introduction to Microbes and the Immune System	3
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
CHM 221	Introduction to Structure and Dynamics	4
CHM 205	Chemical Dynamics Laboratory	1
WRS 106 or 107	First-Year Writing II or First-Year Writing II: STEM	3
	Credit Hours	**16**
Sophomore Year		
Fall		
BPH 206	Introduction to Public Health	3
BPH 202	Introductory Statistics in Health Care (Also satisfies Arts and Science Statistics Requirement)	3
CHM 222	Organic Reactions and Synthesis	4
CHM 206	Organic Reactions and Synthesis Laboratory	2
MTH 161	Calculus I	4
	Credit Hours	**16**
Spring		
MIC 321	Immunobiology	3
BPH 208	Introductory Epidemiology	3
BMB 401	Biochemistry for the Biomedical Sciences	4
MTH 162	Calculus II	4
Recommended MCAT, GRE, DAT or OAT...		
	Credit Hours	**14**

Junior Year		
Fall		
BPH 310	Global Health	3
BPH 321	Health Promotion and Disease Prevention	3
PHY 101	College Physics I	4
PHY 106	Physics Laboratory 1	1
Foreign Language Course		3
	Credit Hours	**14**
Spring		
MIC 470	Advanced Topics in Microbiology and Immunology (B) (or MIC 460 in the Fall)	3
BPH 309	Health and Environment	3
BPH 322	Introduction to Health Policy	3
PHY 102	College Physics II	4
PHY 108	Physics Laboratory 2	1
Possible MCAT, GRE, DAT or OAT...		
Arts and Humanities Cognate Course		3
	Credit Hours	**17**
Senior Year		
Fall		
MIC 323	Microbial Biology and Pathogenesis	3
Choose one of the following from our research courses (optional):		6
MIC 451	Special Projects in Immunobiology	
MIC 452	Special Projects in Microbiology	
MIC 453	Special Projects in Parasitology	
CHM Elective (optional to get CHM minor) if not, you must have other minor		3
Applications to Medical or Graduate School		
BPH 465	Public Health Statistics and Data Management	3
	Credit Hours	**15**
Spring		
MIC 322	Medical Parasitology	3
BPH 305	Issues in Health Disparities	3
BPH 490	Field Practicum in Community Health (Must be taken your last semester at UM)	4
Arts and Humanities Cognate Course		3
Arts and Humanities Cognate Course		
	Credit Hours	**13**
	Total Credit Hours	**121**