

Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

School of Public Health Department of Epidemiology and Biostatistics

Master of Science in Public Health Microbiology and Emerging Infectious Diseases

2018-2019

Program-at-a-Glance

Note: All curriculum revisions will be updated immediately on the website <http://www.publichealth.gwu.edu>

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Mission

The mission of the MS degree in Public Health Microbiology and Emerging Infectious Diseases is to provide training to a new generation of public health professionals to expand knowledge and expertise in the areas of disease mechanisms, with an emphasis on microbial pathogens, the use and application of modern biotechnologies and in epidemiologic skills relevant to the prevention and control of problems in the community arising from infectious diseases.

Graduates of the MS program will have an in-depth understanding of the major laboratory, clinical, and public health aspects of humankind's microbial pathogens, and acquire epidemiologic skills relevant to the prevention and control of problems arising from infectious diseases and modern biotechnologies. Areas of emphasis will include: the design and analysis of epidemiologic data; emerging infections; tropical diseases; and applications of genomics, proteomics, and bioinformatics. MS graduates will be employed in academic and industrial research laboratories, international health agencies, NGOs, and private consulting groups. In addition, they may work in federal, state, and local public health agencies or state and local public health laboratories where their technical expertise and population-based perspective will be extremely useful. Students earning this degree will help meet a national demand that has reached critical proportions for a trained workforce in biodefense and emerging infections, and an international demand for training in diseases that affect the developing countries.

Goals

The goals of the MS Program in Public Health Microbiology and Emerging Infectious Diseases are to ensure that graduates:

- Identify the biological complexities of microbial pathogens and the diseases they cause
- Recognize the major epidemiologic and clinical features of microbial disease
- Identify how new biotechnologies (including genomics, proteomics, and bioinformatics) can be applied to the study and control of microbial pathogens
- Develop an in-depth understanding of epidemiologic principles and practice
- Apply the principles of epidemiology, microbiology, and public health practice toward the detection, surveillance, investigation, and control of microbial diseases

Course Requirements

The total 45 credit hours are distributed approximately evenly between foundation courses, required courses, elective courses, the Field/Laboratory Experience (F/LE) and the Final Project (FP). It is expected that most students will complete the degree in approximately two years to three years, depending on the course load taken each semester.

All of the required courses are offered in the late afternoon or early evening, so it is practical in many cases for students to work full- or part-time while enrolled in the program.

Foundation Courses	10 credits
Required Epidemiology/Public Health/Microbiology Courses	22 credits
Elective Courses	9 credits
Field/Laboratory Experience	2 credits
Final Project Credits	2 credits
Total	45 credits

Admissions Requirements

The Admissions Committee requires students to have the following prerequisites to apply to this degree:

- Bachelor's degree in the life sciences or at least 12 credits in the biological sciences other than botany.
- Chemistry \geq 3 Credits
- 1 semester of calculus
- All prerequisites must be completed before matriculating.

Competencies

- Identify the biological, environmental, and socio-behavioral determinants of human diseases, and of the public health impacts of disease. Course: PUBH 6003, PUBH 6004, PUBH 6245, PUBH 6276, PUBH 6278, PUBH 6280.
- Distinguish the laboratory characteristics of bacterial, viral, and parasitic pathogens, as well as biological Class A, B, C agents associated with bioterrorism. Courses: PUBH 6003, PUBH 6245, PUBH 6275, PUBH 6276, PUBH 6278, PUBH 6280, MICR 8210

- Recognize the public health manifestations of infectious agents. Course: PUBH 6245, PUBH 6276 , PUBH 6277, MICR 8210
- Demonstrate familiarity with the principles of public health genomics. Course: PUBH 6277
- Describe the principles of microbial disease surveillance and epidemiology. Courses: PUBH 6003, PUBH 6016, PUBH 6245, PUBH 6247, PUBH 6259, PUBH 6280
- Identify and analyze patterns of disease, to postulate hypotheses, to plan and implement studies (including outbreak investigations and analytic studies), to analyze, interpret and communicate results, and to evaluate the public health impact of such efforts. Courses: PUBH 6002, PUBH 6003, PUBH 6016, PUBH 6245, PUBH 6247, PUBH 6249, PUBH 6259, PUBH 6262, PUBH 6280
- Recognize public health roles and procedures of biomedical and public health laboratories. Course: PUBH 6016, PUBH 6275, PUBH 6280

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Prerequisites				Credits
Preference Given to Applicants with Biological or Public Health Laboratory Experience				
Biological Sciences other than Botany				≥ 12
Chemistry				≥ 3
Calculus				≥ 3
Required Foundation Courses – 10 Credits				
Course #	Course Title	Credits	Semester Offered	
PUBH 6002	Biostatistical Applications for Public Health	3	Fall, Spring, Summer	
PUBH 6003	Principles and Practice of Epidemiology	3	Fall, Spring, Summer	
PUBH 6004	Environmental & Occupational Health	2	Fall, Spring, Summer	
PUBH 6275	Essential Public Health Laboratory Skills	2	Summer	
Required Epidemiology/Microbiology Courses – 22 Credits				
Course #	Course Title	Credits	Semester Offered	
PUBH 6245	Infectious Disease Epidemiology	2	Spring	
PUBH 6247	Design of Health Studies	3	Fall, Spring	
PUBH 6249	Use of Statistical Packages: Data Management and Data Analysis	3	Fall, Spring	
PUBH 6259	Epidemiologic Surveillance in Public Health	2	Spring	
PUBH 6262	Introduction to Geographic Information Systems	1	Fall, Spring, Summer	
PUBH 6276	Public Health Microbiology	3	Fall	
PUBH 6277	Public Health Genomics	2	Spring	
PUBH 6278	Public Health Virology	3	Spring	
MICR 8210	Infection and Immunity	3	Spring	
Elective Courses – 9 Credits*				
<i>*Note: There are additional elective courses not listed here that might be appropriate. Enrollment in one of these possible alternative courses requires advanced advisor approval/petition.</i>				

Course #	Course Title	Credits	Semester Offered	
PUBH 6127	Applied Environmental Health Microbiology	2	Spring	
PUBH 6132	WASH: Disaster Relief Management & Development	1	Fall	
PUBH 6239	Epidemiology of Foodborne and Waterborne Diseases	1	Summer	
PUBH 6242	Clinical Epidemiology and Decision Analysis	2	Spring	
PUBH 6243	Topics in Clinical Epidemiology and Decision Analysis			
PUBH 6250	Epidemiology of HIV/AIDS	2	Fall	
PUBH 6252	Advanced Epidemiologic Methods	3	Spring	
PUBH 6253	Issues in HIV/AIDS Care and Treatment	1	Fall	
PUBH 6263	Advanced Geographic Information Systems	1	Fall	
PUBH 6270	HIV/AIDS Surveillance	1	Fall	
PUBH 6271	Disaster Epidemiology: Methods and Applications	1	Summer	
PUBH 6299	TOPICS: Epidemiology of Sexually Transmitted Infections	2	Spring	
PUBH 6358	Vaccine Policy	2	Fall	
PUBH 6399	TOPICS: Homeland Security and Public Health	1	Varies	
PUBH 6484	Prevention & Control of Vector-Borne Diseases	2	Fall, Spring	
PUBH 6487	Emerging Zoonotic Diseases and Global Food Animal Production	1	Fall	
MICR 6292	Tropical Infectious Diseases	2	Spring	
MICR 8230	Molecular and Cellular Immunology	3	Fall	
Field/Laboratory Experience and Final Project – 4 Credits				
Course #	Course Title	Credits	Semester Offered	
PUBH 6016	Field/Laboratory Experience	2	Fall, Spring, Summer	
PUBH 6280	Final Project	2	Fall, Spring, Summer	

Course Descriptions and Registration information can be found on the website:
<http://publichealth.gwu.edu/academics>.
<http://publichealth.gwu.edu/academics/>.

Sample Schedule for 2-Year Completion (Fall Semester Start)

Semester	Credits	Course #	Course Name	Day/Time
Fall 1st Year 9 credits	3	PUBH 6003	Principles and Practice of Epidemiology	T- 6:10-9:00 or W- 3:10-6:00
	3	PUBH 6002	Biostatistical Applications for Public Health	M- 3:10-6:00 or W- 6:10-9:00
	3	PUBH 6276	Public Health Microbiology	R- 3:10-6:00
Spring 1st Year 9 credits	2	PUBH 6245	Infectious Disease Epidemiology	M- 4:10-6:00
	3	PUBH 6247	Design of Health Studies	W- 6:10-9:00
	3	MICR 8210	Infection of Immunity	M,W- 10:15-11:45
	1	PUBH Elective	<i>Varies</i>	<i>Varies</i>
Summer 1st Year 6 credits	2	PUBH 6016	Field/Laboratory Experience	N/A
	2	PUBH 6004	Environmental and Occupational Health in a Sustainable	M,W- 3:45-6:00
	2	PUBH Elective	World <i>Varies</i>	<i>Varies</i>
Fall 2nd Year 8 credits	3	PUBH 6249	Use of Statistical Packages	T- 6:10-9:00
	1	PUBH 6262	Introduction to Geographic Information Systems	R- 6:10-9:00
	4	PUBH Elective	<i>Varies</i>	<i>Varies</i>
Spring 2nd Year 9 credits	2	PUBH 6259	Epidemiologic Surveillance in Public Health	F- 3:10-5:00
	2	PUBH 6277	Public Health Genomics	W- 4:10-6:00
	3	PUBH 6278	Public Health Virology	R 3:10-6:00
	2	PUBH Elective	<i>Varies</i>	<i>Varies</i>
Summer 2nd Year 4 credits	2	PUBH 6275	Essential Public Health Laboratory Skills	2-week period in June 1:00-5:00
	2	PUBH 6280	Final Project	N/A

Both the Field Experience and the Final Project require substantial lead time to plan. Make sure that you start planning your Field Experience the semester before you wish to conduct it, and your Final Project approximately 2 semesters before you plan to complete it.