Milken Institute School of Public Health THE GEORGE WASHINGTON UNIVERSITY	**School of Public Health** **Department of Epidemiology** **Master of Science in Public Health Microbiology and Emerging Infectious Diseases** **2024-2025** **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	23 credits
Elective Courses	8 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 ≥ 3 Credits
- All prerequisites must be completed before matriculating.

Competencies

- Identify the public health presentation and impacts of infectious agents.
  Courses: PUBH 6245, PUBH 6276, PUBH 6861, PUBH 6291/MICR 8210.
- Describe the principles of microbial disease surveillance and epidemiology.
  Courses: PUBH 6016, PUBH 6245, PUBH 6259, PUBH 6280
- Plan and implement studies to analyze patterns of disease and to evaluate the public health impact.
  Courses: PUBH 6245, PUBH 6247, PUBH 6259, PUBH 6262, PUBH 6278 , PUBH 6280

- Interpret and communicate results of outbreak investigations and analytic studies.
  Courses: PUBH 6245, PUBH 6259, PUBH 6262, PUBH 6853, PUBH 6280, PUBH 6291/MICR 8210
- Define public health roles and procedures of biomedical and public health laboratories
  Courses: PUBH 6016, PUBH 6275, PUBH 6280
- Understand currently used laboratory techniques and principles in public health microbiology and genomics that are used to distinguish characteristics of pathogens.
  Courses: PUBH 6016, PUBH 6275, PUBH 6276, PUBH 6861, PUBH 6280
- Understand modes of transmission, pathogenic mechanisms, and immune responses as well as challenges for developing successful vaccines and/or drugs
  Courses: PUBH 6016, PUBH 6245, PUBH 6276, PUBH 6278, PUBH 6291/MICR 8210, PUBH 6280,

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Public Health Microbiology and Emerging Infectious Disease

2024-2025
Program-at-a-Glance

Prerequisites

Preference Given to Applicants with Biological or Public Health Laboratory Experience

Course	Credits
Biological Sciences other than Botany	≥ 12
Chemistry	≥ 3

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 6007	Social & Behavioral Approaches to Public Health	2	Fall, Spring, Summer
PUBH 6275	Essential Public Health Laboratory Skills	2	Summer
PUBH 6080	Pathways to Public Health (*Students without a prior degree from a CEPH-accredited program or school of public health will be required to successfully pass the free, zero-credit, online course within one year of matriculation. There is no fee for this course.)*	0	Fall, Spring, Summer (Online Delivery)

Required Epidemiology/Microbiology Courses – 23 Credits

Course #	Course Title	Credits	Semester Offered
PUBH 6245	Infectious Disease Epidemiology	2	Spring
PUBH 6247	Epidemiologic Methods 1: Design of Health Studies	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 6278	Public Health Virology	3	Spring
PUBH 6853	Use of Statistical Packages: Data Management and Data Analysis	3	Fall, Spring
PUBH 6861	Public Health Genomics	3	Spring
PUBH 6291/ MICR 8210	Infection and Immunity	3	Spring

Elective Courses – 8 Credits*

**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. Courses are also subject to change and not all courses will be offered every academic year.*

Course #	Course Title	Credits	Semester Offered
PUBH 6011	Environmental and Biological Fundamentals of Public Health	3	Fall, Spring, Summer
PUBH 6233	Epi Principles and Practice of Disease Eradication	2	Spring

PUBH 6234	Epi Methods in Neglected Tropical Disease Control	1	Fall, Spring
PUBH 6238	Molecular Epidemiology	1	Summer
PUBH 6239	Epidemiology of Foodborne and Waterborne Diseases	1	Summer
PUBH 6240	Pediatric HIV/AIDS	1	Summer
PUBH 6242	Clinical Epidemiology and Decision Analysis	2	Spring
PUBH 6243	Topics in Clinical Epidemiology and Decision Analysis	1	Spring
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 6255	Organizational Responses to HIV Epidemics	2	Spring
PUBH 6263	Advanced Geographic Information Systems	1	Fall
PUBH 6271	Disaster Epidemiology: Methods and Applications	1	Fall
PUBH 6279	Next Gen Sequencing Lab Skills	1	Summer
PUBH 6299	TOPICS: HIV Prevention Epi and Methods	2	Fall
PUBH 6299	TOPICS: Public Health Lab Response to EID	1	Fall
PUBH 6455	Global Vaccinology	3	Summer
PUBH 6484	Prevention & Control of Vector-Borne Diseases	2	Spring
PUBH 6486	Global Health Programs and Approaches to the Control of Infectious Diseases	2	Fall
PUBH 6851	Intro to R for Public Health Research	1	Fall
PUBH 6852	Intro to Python for Public Health Research	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)

*Note: Times are subject to change each academic year. Courses may be offered at different times if offered during multiple semesters.

Semester	Credits	Course #	Course Name	Day/Time
Fall 1st Year	3	PUBH 6003	Principles and Practice of Epidemiology	T- 6:10-9:00 or W- 3:10-6:00
9 credits	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	2	PUBH 6245	Infectious Disease Epidemiology	T- 4:10-6:00
9 credits	3	PUBH 6247	Design of Health Studies	W- 6:10-9:00
	3	PUBH 6279/	Infection & Immunity	M,W- 10:15-11:45
	1	MICR 8210		
		PUBH Elective	*Varies*	*Varies*
Summer 1st Year	2	PUBH 6016	Field/Laboratory Experience	N/A
6 credits	2	PUBH 6007	Social & Behavioral Approaches to Public Health	T,R- 3:10-5:30
	2	PUBH Elective(s)	*Varies*	*Varies*
Fall 2nd Year	3	PUBH 6853	Use of Statistical Packages	T- 6:10-9:00
8 credits	1	PUBH 6262	Introduction to Geographic Information Systems	R- 6:10-9:00
	4	PUBH Elective(s)	*Varies*	*Varies*
Spring 2nd Year	2	PUBH 6259	Epidemiologic Surveillance in Public Health	F- 3:10-5:00
9 credits	3	PUBH 6861	Public Health Genomics	T- 3:10-6:00
	3	PUBH 6278	Public Health Virology	R- 3:10-6:00
	1	PUBH Elective(s)	*Varies*	*Varies*
Summer 2nd Year	2	PUBH 6275	Essential Public Health Laboratory Skills	2-weeks in June 1:00-5:00pm
4 credits	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.