Milken Institute School of Public Health THE GEORGE WASHINGTON UNIVERSITY	**Milken Institute School of Public Health** **Department of Epidemiology** **Master of Science in Public Health Microbiology and Emerging Infectious Diseases** **2025-2026** **Program Guide** 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, and other new biotechnologies. MS graduates could 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 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 36 credit hours are distributed approximately evenly between foundation courses, required courses, elective courses, skills building course and thesis/capstone course. 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.

Foundation Courses	6 credits
Required Epidemiology Courses	8 credits
Selective courses	11-14 credits
Elective Courses	6-9 credits
Final Project	2 credits
Total	**36 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
- All prerequisites must be completed before matriculating.

Competencies
- Identify the public health presentation and impacts of infectious agents.
  Courses: PUBH 6245/6486,
  PUBH 6861/BIOC 6240/6241/MICR 6236,
  PUBH 6291/MLS 6141,
  PUBH 6275,
  PUBH 6259/6484/6468.
- Describe the principles of microbial disease epidemiology.
  Courses: PUBH 6245/6486, PUBH 6259/6484/6468
- Plan and implement studies to analyze patterns of disease and to evaluate the public health impact.
  Courses: PUBH 6245/6486, PUBH 6247, PUBH 6252, PUBH 6259/6484/6868
- Interpret and communicate results of outbreak investigations and analytic studies.
  Courses: PUBH 6245/6486, PUBH 6853, PUBH 6252/6260

- Define public health roles and procedures of biomedical and public health laboratories
  Courses: PUBH 6276/6278/BISC 6212.MLS 6216/6119/6117,
  PUBH 6861/BIOC 6240/6241/MICR 6236
  PUBH 6275/6860
- Identify currently used laboratory techniques and principles in public health microbiology and genomics that are used to distinguish characteristics of pathogens.
  Courses: PUBH 6276/6278/BISC 6212.MLS 6216/6119/6117,
  PUBH 6861/BIOC 6240/6241/MICR 6236,
  PUBH 6275/6860
- Explain modes of transmission, pathogenic mechanisms, and immune responses as well as challenges for developing successful vaccines and/or drugs
  Courses: PUBH 6245/6486,
  PUBH 6276/6278/BISC 6212.MLS 6216/6119/6117,
  PUBH 6291/MLS 6141,
  PUBH 6468/6484

Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

Master of Science
Public Health Microbiology and Emerging Infectious Disease

2025-2026
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 – 6 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 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 Courses-8 Credits

Course #	Course Title	Credits	Semester Offered
PUBH 6245 Or PUBH 6486	Infectious Disease Epidemiology GH Programs and Approaches to Control for Infectious Disease	2 2	Spring Fall
PUBH 6247	Epidemiologic Methods 1: Design of Health Studies	3	Fall, Spring
PUBH 6853	Use of SAS for Data Management and Data Analysis	3	Fall, Spring

Selective Courses – 11-14 Credits

	Microbiology Selectives (select 1 of the following)	2-3	
PUBH 6276	Public Health Microbiology	3	Fall
PUBH 6278	Public Health Virology	3	Spring
BISC 6212	Virology and Antiviral Immunity	3	Fall
MLS 6216	Microbial Pathogenesis	3	
MLS 6119	Advanced Parasitology, Mycology, and Virology	2	
MLS 6117	Advanced Clinical Bacteriology	2	
	Immunology Selectives (select 1 of the following)	3	
PUBH 6291	Infection and Immunity	3	Spring
MLS 6141	Advanced Immunology and Serology	3	
	Genomics Selectives (select 1 of the following)	2-3	
PUBH 6861	Public Health Genomics	3	Spring
BIOC 6241	Single Cell Genomics	2	Spring
BIOC 6240	Next Gen Sequencing	2	Spring
BIOC 6246	Advanced Genomic Data Analysis	3	

MICR 6236	Fundamentals of Genomics	3	Fall
	Methods Selectives (select 1 of the following)	2-3	
PUBH 6275	Essential Public Health Lab Skills	2	Varies
PUBH 6860	Principles of Bioinformatics	3	Varies
PUBH 6252	Epi Methods 2: Advanced Epidemiologic Methods	3	Fall, Spring
PUBH 6260	Applied Epidemiologic Data Analysis	3	Fall, Spring
	Infectious Disease Selectives (select 1 of the following)	2	
PUBH 6259	Epidemiologic Surveillance in Public Health	2	Spring
PUBH 6468	Preparation and Response to Epidemics, Pandemics, Mass Health Emergencies and Disasters	2	Varies
PUBH 6484	Prevention & Control of Vector-Borne Diseases	2	Spring

Elective Courses – 6-9 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. Courses not used as selectives can be used as electives.*

Course #	Course Title	Credits	Semester Offered
PUBH 6011	Environmental and Biological Fundamentals of Public Health	3	Fall, Spring, Summer
PUBH 6127	Introduction to Environmental Health Microbiology	2	Varies
PUBH 6146	Microbiomes and Microbial Ecology in Public Health	2	Varies
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 6251	HIV Prevention Epidemiology and Methods	2	Fall
PUBH 6253	Issues in HIV/AIDS Care and Treatment	1	Fall
PUBH 6255	Organizational Responses to HIV Epidemics	2	Spring
PUBH 6262	Introduction to Geographic Information Systems	1	Fall, Spring, Summer
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 in Epidemiology (Epidemiology of Sexually Transmitted Infections	1-3	Varies
PUBH 6358	Vaccine Policy	2	Varies
PUBH 6386	Public Health Preparedness Policy	2	Varies
PUBH 6455	Global Vaccinology	3	Summer
PUBH 6487	Emerging Zoonotic Diseases and Global Food Production	1	Varies
PUBH 6850	Intro to SAS for Public Health Research	1	Varies
PUBH 6851	Intro to R for Public Health Research	1	Fall
PUBH 6852	Intro to Python for Public Health Research	1	Fall

PUBH 6856	Advanced SAS for Public Health Research	1	Varies
GEOG 6304	Geographical Information Systems I	3	Varies
GEOG 6305	Geospatial Statistics	3	Varies
GEOG 6306	Geographical Information Systems II	3	Varies
GEOG 6309	GIS for Emergency Management	3	Varies
MICR 6292	Tropical Infectious Diseases	2	Spring
MICR 8230	Molecular and Cellular Immunology	3	Fall
Final Project– 2 Credits			
Course #	**Course Title**	**Credits**	**Semester Offered**
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
Fall 1st Year	3	PUBH 6003	Principles and Practice of Epidemiology
9 credits	3	PUBH 6002	Biostatistical Applications for Public Health
	0	PUBH 6080	Pathways to Public Health
	3	TBD	Selective and/or electives
Spring 1st Year	2	PUBH 6245	Infectious Disease Epidemiology
9 credits	3	PUBH 6247	Epi Methods 1: Design of Health Studies
	3	PUBH 6853	Use of Statistical Packages
	1	TBD	Elective
Fall 2nd Year	9	TBD	Selectives and/or electives
9 credits			
Spring 2nd Year	7	TBD	Selectives and/or electives
9 credits	2	PUBH 6280	Thesis

Sample Schedule for 1-Year Completion (Mandatory Summer Semester Start)

Semester	Credits	Course #	Course Name
Summer	3	PUBH 6003	Principles and Practice of Epidemiology
6 credits	3	PUBH 6002	Biostatistical Applications for Public Health
	0	PUBH 6080	Pathways to Public Health
Fall	3	PUBH 6247	Epi Methods 1: Design of Health Studies
12 credits	3	PUBH 6853	Use of Statistical Packages
	6	TBD	Selectives and/or electives
Spring	2	PUBH 6245	Infectious Disease Epidemiology
12 credits	10	TBD	Selectives and/or Electives
Summer	2	PUBH 6280	Final Project
6 credits	4	TBD	Selectives and/or Electives