Milken Institute School of Public Health THE GEORGE WASHINGTON UNIVERSITY	**Department of Biostatistics and Bioinformatics** **MS in Health Data Science** **2025-2026** Note: All curriculum revisions will be updated immediately on the website http://www.publichealth.gwu.edu

Program Director

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Mission

The mission of the MS in Health Data Science is to train the next generation of leaders and practitioners in public health and medicine. Students in the program develop practical skills for innovative data analysis and will be trained in becoming excellent communicators of scientific findings in public health and biomedical research. The program takes advantage of the rich bioinformatics and biostatistical resources at GW and in the nation's capital and is designed to prepare students to be independent practitioners and collaborators in interdisciplinary research.

MS Competencies

Upon completion of the MS program in Health Data Science students will possess the following competencies.

1. **Programming:** Develop skills in programming, data structures, algorithms, machine learning, high-performance computing and apply these skills to create approaches that facilitate biological data analysis.
2. **Biology:** Develop a basis of knowledge in biology and evaluate biological data generation technologies.
3. **Statistics:** Apply statistical research methods in the context of molecular biology, genomics, medical, and population genetics research.
4. **Foundational Knowledge:** Interpret and synthesize the various foundational concepts of bioinformatics, including genomics, algorithms, and other key tools used in bioinformatics.
5. **Conceptual Integration:** Integrate concepts and data across fields of computer science, statistics, data science, biology, and health sciences through bioinformatics.

Minimum Program Requirements

The program requires a total of 36 credit hours of course work including a minimum of 2 credits of research and Master's Thesis work. Students in the program must hold an undergraduate degree from an accredited institution of higher learning and should have a strong background in mathematics, statistics, biology, bioengineering, and/or computer science.

Prerequisites

- a course in undergraduate statistics
- a course in undergraduate biology
- a course in undergraduate computer science

All applications are submitted through SOPHAS.org. Information about Milken Institute SPH Admissions and policies are available online at http://publichealth.gwu.edu/admissions/graduate-admissions. For reporting GRE general test scores use the following institutional code: 5268.

Program Requirements

The curriculum includes broad training across core areas of bioinformatics, including statistics, biology, computer science, and ethical issues in the conduct of biomedical research. The program requires a total of 36 credit hours of coursework including a minimum of 2 credits of research and Master's Thesis work.

Course Distribution Summary	**Credits**
Required Courses	18
Elective Courses	16
Master's Thesis and additional research courses (minimum required)	2
Total credits	**36**

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Required Courses (18 credits)			
PUBH 6850	Introduction to SAS for Public Health Research	Fall, Spring	1
PUBH 6851	Introduction to R for Public Health Research	Fall, Spring	1
PUBH 6852	Introduction to Python for Public Health Research	Fall, Spring	1
PUBH 6860	Principles of Bioinformatics	Fall	3
PUBH 6884	Bioinformatics Algorithms and Data Structures	Spring	3
PUBH 6854	Applied Computing	Fall	3
PUBH 6868	Quantitative Methods	Spring	3
PUBH 6886	Statistical and Machine Learning for Public Health Research	Fall	3
PUBH 6080	Pathways to Public Health^	Any time	0
Elective Courses (16 credits)			
PUBH 6859	High Performance and Cloud Computing	Spring	3
PUBH 6861	Public Health Genomics	Spring	3
PUBH 8885	Computational Biology	Fall	3
PUBH 6894	Research Analytics	Online	3
PUBH 6867	Health Data Visualization	Spring	3
PUBH 8878	Statistical Genetics	Fall	3
PUBH 6870	Advanced Survival Analysis Markov Multistate Models	Spring	1
PUBH 6871	Advanced Survival Analysis Recurrent Events	Spring	1
PUBH 6872	Advanced Survival Analysis Competing Risks	Spring	1
Topic Courses*			
	Microbiome Data Analysis in R		2
	Neural Networks with Applications in Biomedical Research		1
	Databases and Structured Query Language		1
	Generative Artificial Intelligence for Health Data Analysis		3
Required Research/Thesis Courses#			
PUBH 6897	Research in Biostatistics and Bioinformatics	Fall, Spring, Summer	1-4
PUBH 6898	Master of Science Thesis	Fall, Spring, Summer	1-3

* *The list of elective courses includes the following topics courses (PUBH 6899). Students are free to choose any or all of sections 1, 2, and 3 of the Advanced Survival Analysis course.*

A minimum of one credit each of PUBH 6897 and PUBH 6898 is required. If more credits are taken, they will count towards the elective credits.

^ PUBH 6080 will be waived for students who have a prior degree from a CEPH-accredited school or program of public health

MS Graduation Requirements

Graduation

While degrees are awarded at the end of each semester, formal commencement ceremonies occur only in May. Students are eligible to participate in graduation activities only after they have completed all degree requirements and have no financial obligations to the University. Students may include MS designation after their name upon completion of all degree requirements.

Graduation Requirements

1. **Credits**: Successful completion of 36 credits.

2. **Master's Thesis or Research Report:** Successful defense of a Master's Thesis or presentation of a Research Report. The defense of a Master's Thesis is different from the PUBH 6898 Master of Science Thesis course, which is a requirement.

3. **Grade point average**: A minimum program grade-point average of B (3.0).

4. **Time Limit Requirement**: The degree must be completed within five years.

5. **Transfer Credits**: Up to 12 relevant graduate credits that have not been applied to a previous degree may be transferred to the MS after approval by the Program Director. External credits must have been earned from an accredited institution in the last three years with a grade of 3.0 (B) or better. SPH Graduate Certificate students can transfer as many credits as meet program requirements, up to 18 credits, to the MS. Graduate Certificate students wishing to transfer to a degree program may submit a petition online to do so after completion of 3 or more courses and a cumulative GPA of 3.0 or better. A grade of B or better is required for a course to be eligible for transfer.

6. **Ethics/Professional Skills Requirement:** Participate in department-led ethical and professional skills training.

7. **Professional Enhancement requirement**: Students must participate in 8 hours per degree program of advisor pre-approved Public Health-related lectures, seminars, symposia and/or conferences related to the appropriate field of study specifically focused on research and research ethics. Students must submit documentation of Professional Enhancement activities to the SPH Office of Student Records. Instructions can be found here: https://publichealth.gwu.edu/academics/forms

8. **CITI Training requirement**: All students are required to complete training regarding human subject protection regulation and the Health Insurance Portability and Accountability Act of 1996 (HIPAA). To fulfill this requirement, you must complete the Collaborative IRB Training Initiative (CITI) Course in The Protection of Human Research Subjects.

9. **Integrity Quiz & Plagiarism Requirement**: All students are required to review the George Washington University Code of Academic Integrity and take the quiz within their first semester of study. The Code of Integrity and step-by-step instructions can be found here: http://publichealth.gwu.edu/integrity

Sample Schedule MS-HDS

Year	Semester	Course	Title	Credits
Year 1	Fall	PUBH 6850	Introduction to SAS for Public Health Research	1
		PUBH 6851	Introduction to R for Public Health Research	1
		PUBH 6852	Introduction to Python for Public Health Research	1
		PUBH 6860	Principles of Bioinformatics	3
		PUBH 6854	Applied Computing	3
		PUBH 6080	Pathways to Public Health^	0
	Spring	PUBH 6868	Quantitative methods	3
		PUBH 6884	Bioinformatics Algorithms and Data Structures	3
		PUBH 68xx	Electives	3
Year 2	Fall	PUBH 6886	Statistical and Machine Learning for Public Health Research	3
		PUBH 68xx PUBH 88xx	Electives	6
	Spring	PUBH 68xx PUBH 88xx	Electives	2-7
		PUBH 6897	Research in Biostatistics and Bioinformatics (minimum required)*	1-4
		PUBH 6898	Master of Science Thesis (minimum required)*	1-3

***** PUBH 6897 and PUBH 6898 are offered in Spring, Summer and Fall
^ PUBH 6080 can be taken online during the first year of matriculation