Biostatistics, M.S.

Degree Offered

- Master of Science (MS)

Certificate Offered

- Applied Biostatistics

Nature of the Program

Biostatistics is the science of applying statistical theory and principles to research in public health, medicine, biology, pharmaceuticals, environmental science, and other related fields.

The Master of Science (MS) Program in Biostatistics is meant for college graduates with interest and background in mathematics and statistics who wish to learn both the methodology and the application of biostatistics in the health sciences. The goals of this program are similar to the current MPH in Biostatistics Program in learning objectives; however, MS students will receive a more extensive methodological foundation as well as be expected to take additional statistical courses instead of the “core” public health courses required for any MPH.

A typical student who graduates with an MS in Biostatistics from WVU would be qualified to work as a biostatistician or research coordinator in research organizations such as a pharmaceutical company, contract research organization (CRO), a university, or a health department. MS graduates also will be prepared to pursue doctoral education in biostatistics or similar disciplines.

APPLIED BIOSTATISTICS CERTIFICATE

The Applied Biostatistics Certificate is designed for those individuals who lack formal training in biostatistics and would like to gain skills needed to understand and apply standard statistical techniques. It is a **fully online program** that is available to practitioners and/or students at WVU and elsewhere.

The primary objectives of the program are thus to:

- Describe basic concepts of probability and statistical inference
- Demonstrate standard techniques of database management and analysis
- Compare and contrast study designs common to health research
- Recognize the primary sources of bias observed in health research
- Interpret appropriate inferences from data based on strengths and limitations of major epidemiologic study designs as well as the results of descriptive and inferential statistical analyses

Individuals who would be interested in such a Certificate include clinical and translational researchers at varying levels of their career (faculty, fellows, residents, basic scientists) as well as public health practitioners, in the state of West Virginia or beyond. Interested individuals in the program should have a desire to be more self-sufficient with their research, specifically being able to know basic study design principles, analyze their data, and interpret their results.

The entire curriculum will be available both **online and in-person (live)**, thus being accessible to individuals from a variety of backgrounds, locations, and experiences. The program will take advantage of existing course technology where courses are taught in a synchronous fashion in which the instructor lectures in-class, and the lecture (along with associated PowerPoint slides or other files, such as SAS programs) is broadcast online. While the lecture is available live during the lecture itself, the video or audio of the lecture is archived and available on the course for access at any time. All course notes, homeworks, programs, etc. are available online, and the instructor is available in a number of formats (online chat, email, phone) to accommodate distance-learning students.

Applied Biostatistics Certificate Program students will typically take one class per semester. Completion of the program will typically take two years. Certificate Program students will pay tuition at the standard School of Public Health per-credit rate. Please visit the School of Public Health financial information link (http://publichealth.hsc.wvu.edu) for more information on current rates.

FACULTY

CHAIR

- Bethany Barone Gibbs - PhD (Johns Hopkins University)

PROFESSOR

- Sijin Wen - PhD (The University of Texas Health Sciences Center at Houston)

ASSOCIATE PROFESSOR

- Christa L. Lilly - PhD (Vanderbilt University)

ASSISTANT PROFESSOR

- Caroline P Groth - PhD (University of Minnesota)

Admissions for 2026-2027

If you are ready to apply to West Virginia University School of Public Health, the admissions team is here to assist you.

ADMISSIONS GUIDELINES

- Baccalaureate degree from an accredited college or university (preferred GPA: 3.0 overall; 3.4 for quantitative courses)
- Course experience including:
    - Calculus I (MATH 155 or MATH 153/154 or equivalent; preferred at admission)
    - Calculus 2 (MATH 156 or equivalent) needed before taking BIOS 612.
    - Knowledge of a programming language or statistical language is preferred (but not required)
- A completed MS application, including a Statement of Purpose
- Two letters of recommendation

Math Requirement:

- Students must complete through Calculus 2 (MATH 156 or equivalent) prior to taking BIOS 612: Biostatistical Theory (taken in Fall of year 2 for full time students). Students may take math courses during first year of program (or over the summer) to meet this requirement above the course load in the plan of study.

APPLICATION PROCESS

Our Master of Biostatistics Program participates in the Schools of Public Health Application Service (SOPHAS), http://www.sophas.org/ (https://nam04.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.sophas.org%2F&data=05%7C02%7Ccaroline.groth%40hsc.wvu.edu%7Ce0486b5318164e05211008dd4aac1ebc%7Ca2d1f95f851044248ae15c596bdbd578%7C0%7C0%7C638748825410662938%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=cvNSdwZ1Flh5Y8ZQMWsPXQ%2Bo4kUUvAQ21cbLIjsObfU%3D&reserved=0). **The MS BIOS Admissions process has two steps**. (1) All **applications** must be submitted through the national SOPHAS service and (2) applicants must also submit a WVU Graduate application, https://graduateadmissions.wvu.edu/ (https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgraduateadmissions.wvu.edu%2F&data=05%7C02%7Ccaroline.groth%40hsc.wvu.edu%7Ce0486b5318164e05211008dd4aac1ebc%7Ca2d1f95f851044248ae15c596bdbd578%7C0%7C0%7C638748825410676736%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=C%2BalGEfs1EP6wGud3RcdRthqiPIeqy28v4ie4zfAPZ0%3D&reserved=0).

In addition to the application, applicants must submit to SOPHAS a personal statement, two or three letters of reference, a current resume/curriculum vitae, and all university transcripts. SOPHAS requires **original transcripts** from **ALL** U.S. and International institutions attended (even Study Abroad).

There is a SOPHAS application fee.

- E-submit your application as soon as the applicant entered information is complete. Do NOT wait for SOPHAS to receive transcripts, recommendations or test scores.
- Plan Ahead! Allow up to 4 weeks for SOPHAS to verify grades, process, and mail your application to your designated institutions after your documents have been received.

Once the department has reviewed the SOPHAS application, students will receive a communication from the WVU School of Public Health regarding their recommendation for acceptance and instructions to complete the WVU graduate application and pay the application fee.

Please Note: There are both SOPHAS and WVU application fees.

Major Code: 8413

Applied Biostatistics Certificate

ADMISSIONS GUIDELINES

- Baccalaureate degree from an accredited college or university with a preferred overall GPA of 3.0 (official transcripts required)
- Essay describing previous education and experience and career objectives
- Resume or curriculum vitae

- At least two letters of recommendation
- Computer skills are a program requirement. It is the responsibility of the ***students to become skilled in computer applications*** and to participate in the Health Sciences Center Mandatory Laptop Program.

Students interested in applying for the Applied Biostatistics Certificate must:

- Complete the WVU graduate application and indicate Applied Biostatistics Certificate and submit with the processing fee.
- https://app.applyyourself.com/AYApplicantLogin/ApplicantConnectLogin.asp?id=wvugrad
- **Students currently enrolled at WVU should fill out the admissions form for current students to apply for the Applied Biostatistics Certificate and contact Associate Professor, Dr. Christa Lilly *prior* to submitting the application.**
- Submit official school transcripts to:

  WVU HSC Admissions
  64 Medical Center Drive
  1170 HSC North
  Morgantown, WV 26506

- International students must submit to:

  Office of Graduate Admissions and Recruitment
  PO Box 6510
  Morgantown, WV 26506-6510

MS Major Code: 8413

Master of Science in Biostatistics

MS-Biostatistics students will gain the following general competencies that will be assessed continuously through the assessment processes already in place in the School of Public Health (SPH):

1. Assess foundational concepts of probability and statistical inference.
2. Analyze clinical and public health data using descriptive biostatistical methods.
3. Distinguish appropriate basic inferential statistical analyses and summarize their results.
4. Manage standard statistical software to efficiently manage data structures.
5. Summarize central concepts of statistical theory and inference.
6. Develop appropriate plans to analyze standard continuous data in order to make valid inferences.
7. Develop appropriate plans to analyze standard categorical data in order to make valid inferences.
8. Communicate effectively, in writing and verbally, with substantive investigators and members of the community when assisting in the design of research studies as well as the results of statistical analyses.

MAJOR REQUIREMENTS

Code	Title	Hours
MS Required Courses		
BIOS 610	Biostatistical Methods and Inference	3
BIOS 611	Data Management and Reporting	3
BIOS 612	Biostatistical Theory	3
BIOS 620	Applied Linear Models HS	3
BIOS 621	Categorical Data Analysis HS	3
BIOS 623	Biostatistical Consulting	3
Electives		**6**
BIOS 622	Analysis of Time-to-Event Data	
BIOS 662	Statistics in Clinical Trials	
BIOS 663	Introduction to Meta-Analysis	
STAT 513	Design of Experiments	
EPID 501	Epidemiology for Public Health	
EPID 512	Applied Epidemiology for Public Health	
EPID 611	Concepts and Methods of Epidemiology	
STAT 521	Statistical Analysis System Programming	

STAT 522	Advanced Statistical Analysis System Programming	
STAT 523	Statistical Computing	
STAT 531	Sampling Theory and Methods	
STAT 541	Applied Multivariate Analysis	
STAT 543	Bioinformatics Data Analysis	
STAT 551	Nonparametric Statistics	
Or other approved courses		
Choice of Thesis or Non-Thesis Option		**6**
Thesis Option		
BIOS 628	Biostatistics Practicum	
BIOS 697	Research	
Non-Thesis Option		
BIOS 628	Biostatistics Practicum	
Elective		
Total Hours		30

Plan of Study - Thesis Option

First Year			
Fall	**Hours**	**Spring**	**Hours**
BIOS 610	3	BIOS 620	3
BIOS 611	3	Elective	3
Elective	3		
	9		6
Second Year			
Fall	**Hours**	**Spring**	**Hours**
BIOS 628	3	BIOS 697	3
BIOS 623	3	BIOS 621	3
BIOS 612	3		
	9		6

Total credit hours: 30

Suggested Plan of Study - Non Thesis Option

First Year			
Fall	**Hours**	**Spring**	**Hours**
BIOS 610	3	BIOS 620	3
BIOS 611	3	Elective	3
Elective	3		
	9		6
Second Year			
Fall	**Hours**	**Spring**	**Hours**
BIOS 628	3	BIOS 621	3
BIOS 623	3	Elective	3
BIOS 612	3		
	9		6

Total credit hours: 30

Major Learning Outcomes

BIOSTATISTICS

1. Assess foundational concepts of probability and statistical inference.
2. Analyze clinical and public health data using descriptive biostatistical methods.
3. Distinguish appropriate basic inferential statistical analyses and summarize their results.

4. Manage standard statistical software to efficiently manage data structures.
5. Summarize central concepts of statistical theory and inference.
6. Develop appropriate plans to analyze standard continuous data in order to make valid inferences.
7. Develop appropriate plans to analyze standard categorical data in order to make valid inferences.
8. Communicate effectively, in writing and verbally, with substantive investigators and members of the community when assisting in the design of research studies as well as the results of statistical analyses.