BIOSTATISTICS, MASTER OF SCIENCE (M.S.) WITH A CONCENTRATION IN GENOMIC BIOSTATISTICS

Program goal

The mission of the VCU Department of Biostatistics is to improve human health through methodological research, the education of graduate students and health science researchers in biostatistical methods and applications, and collaborative health sciences research. Faculty members conduct methodological research motivated by collaborative alliances, which in turn contributes to and enhances the department's educational mission. By focusing on the integration of methodological and collaborative research, students develop strong biostatistical and communication skills, enabling them to assume leadership positions in academia, government and industry.

Student learning outcomes

This training program is designed to be completed in 12 months (three semesters: fall, spring, summer) and will help students achieve the following learning outcomes:

1. Explain biostatistical concepts, ideas and methods in plain terms to non-biostatistical researchers
2. Demonstrate the ability to effectively collaborate with biostatistical and health science researchers
3. Develop fluency in several computational languages
4. Display exceptional written and oral communication skills

Students in the genomic biostatistics concentration will achieve the following additional learning outcomes:

5. Identify and utilize the various formats for high-throughput genomic data
6. Use computational tools for analyzing high-throughput genomic data

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the Graduate School website (http://www.graduate.vcu.edu/) and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students. **(**http://bulletin.vcu.edu/academic-regs/**)**

Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements. **(**http://bulletin.vcu.edu/academic-regs/grad/graduation-info/**)**

Other information

School of Medicine graduate program policies

The School of Medicine provides policies applicable to all programs administratively housed in the school. Information on **master's programs** is available elsewhere in this chapter of the Graduate Bulletin.

Apply online today. (https://www.vcu.edu/admissions/apply/graduate/)

Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
Ph.D.	Fall preferred	Applications received prior to Jan 15 given priority consideration	GRE

In addition to the general admission requirements of the VCU Graduate School (http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/), applicants for the M.S. in Biostatistics must complete the verbal, quantitative and analytical writing sections of the Graduate Record Exam.

Additionally, the following mathematics courses or their equivalents are required for admission:

Course	Title	Hours
MATH 307	Multivariate Calculus	4
MATH 310	Linear Algebra	3
STAT 212	Concepts of Statistics	3
STAT 309	Introduction to Probability Theory	3

Although not required, prior course work in additional mathematics, statistics or computer science is helpful.

Degree requirements

In addition to the general VCU Graduate School graduation requirements (http://bulletin.vcu.edu/academic-regs/grad/graduation-info/), M.S. students will complete a minimum total of 33 credit hours of course work, participate in the Summer Student Training Program and present at the Biostatistics Student Research Symposium. M.S. students interested in applying to the Ph.D. program in biostatistics (with no concentration or

with a concentration in genomic biostatistics) are strongly encouraged to take BIOS 513, BIOS 514, BIOS 653 and BIOS 654.

Applied examination

Students pursuing the M.S. degree must pass an applied examination administered after completion of the following courses: BIOS 524, BIOS 601, BIOS 602 and BIOS 606. This examination is graded as pass or fail. A student who does not pass the applied examination will have one opportunity to retake the examination.

Thesis

There is no thesis requirement in the M.S. program.

Course requirements

Course	Title	Hours
Required core courses		
BIOS 524	Biostatistical Computing	3
BIOS 601	Analysis of Biomedical Data I	3
BIOS 602	Analysis of Biomedical Data II	3
BIOS 603	Biostatistical Consulting (one-credit course taken two semesters)	2
BIOS 606	Clinical Trials	3
BIOS 690	Biostatistical Research Seminar (one-credit course taken two semesters)	2
BIOS 697	Directed Research in Biostatistics	1
OVPR 601	Scientific Integrity	1
Required concentration courses		
BIOL/BNFO 540	Fundamentals of Molecular Genetics (or other relevant course)	3
BIOS 658	Statistical Methods for High-throughput Genomics Data I	3
BIOS 668	Statistical Methods for High-throughput Genomic Data II	3
Elective courses		
Select at least two of the following:		6
BIOS 632	Multivariate Analysis	
BIOS 667	Statistical Learning and Data Mining	
BIOS 688	Applied Bayesian Biostatistics	
Total Hours		33

The minimum number of graduate credit hours required for this degree is 33.

Typical plan of study

Many students often end up taking more than the minimum number of hours required for a degree program. The total number of hours may vary depending upon the program, nature of research being conducted by a study or in the enrollment or funding status of the student. Students should refer to their program websites and talk with their graduate program directors or advisers for information about typical plans of study and registration requirements.

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Program website: biostatistics.vcu.edu (http://www.biostatistics.vcu.edu/)