

# 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.

### Biostatistics core outcomes

1. Explain biostatistical concepts, ideas and methods in plain terms to non-biostatistical researchers using exceptional written and oral communication skills
2. Effectively collaborate with biostatistical and health science researchers
3. Demonstrate fluency in a minimum of two computational languages

### Genomic biostatistics concentration-specific outcomes

1. Identify and utilize the various formats for high-throughput genomic data
2. 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** 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.

## Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the [academic regulations section](#) for additional information on degree candidacy requirements.

## 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.

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

## Admission requirements

| Degree: | Semester(s) of entry: | Deadline dates:  | Test requirements: |
|---------|-----------------------|--|--------------------|
| M.S.    | Fall preferred        | Applications received prior to May 15 given priority consideration | GRE (optional)     |

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 may choose to complete the verbal, quantitative and analytical writing sections of the Graduate Record Exam; this is not a requirement for admission.

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, with the option to 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.

In addition to meeting VCU Graduate School and program requirements for graduation, all students enrolled in the School of Population Health must demonstrate competence in foundational public health learning objectives. This requirement is waived for students who previously completed a CEPH-accredited degree at the bachelor's, master's or doctoral level.

## 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     |
|---------------------------------------|---|-----------|
| <b>Required core courses</b>          |   |           |
| 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         |
| <b>Required concentration courses</b> |   |           |
| 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         |
| <b>Elective courses</b>               |   |           |
| Select at least two of the following: |   | 6         |
| BIOS 632                              | Multivariate Analysis   |           |
| BIOS 667                              | Statistical Learning and Data Mining                                    |           |
| BIOS 688                              | Applied Bayesian Biostatistics  |           |
| <b>Total Hours</b>                    |   | <b>33</b> |

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

Students who complete the requirements for this concentration will receive a Master of Science in Biostatistics.

### Contact

Robert A. Perera, Ph.D.  
Associate professor and graduate program director  
[robert.perera@vcuhealth.org](mailto:robert.perera@vcuhealth.org)  
(804) 827-2037

### Additional contact (admissions and prospective students)

Yongyun Shin  
Assistant professor, Department of Biostatistics, and chair of admissions

[yongyun.shin@vcuhealth.org](mailto:yongyun.shin@vcuhealth.org)  
(804) 827-2069

**Program website:** [biostatistics.vcu.edu](http://biostatistics.vcu.edu) (<http://www.biostatistics.vcu.edu/>)